LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
KARYA ILMIAH : JURNAL ILMIAH

Judul Jurnal Ilmiah (Artikel)	:	Quantum yield optimization of carbon dots using response surface methodology and its application as control of Fe3+ion levels in drinking water		
Nama/ Jumlah Penulis	:	3 Orang		
Status Pengusul	:	~~Penulis pertama~~/ ~~Penulis ke~~ / Penulis Korespondesi **		
Identitas Jurnal Ilmiah	:	a. Nama Jurnal	:	Material Research Express
		b. Nomor ISSN	:	2053-1591
		c. Vol, No., Bln Thn	:	Vol 9 No 1, Januari 2022 Hal 1-17
		d. Penerbit	:	IOP Publishing Ltd.
		e. DOI artikel (jika ada)	:	10.1088/2053-1591/ac3f60
		f. Alamat web jurnal	:	https://iopscience.iop.org/article/10.1088/2053-1591/ac3f60
		Alamat Artikel	:	https://iopscience.iop.org/article/10.1088/2053-1591/ac3f60/pdf
		g. Terindex	:	Scopus (Q2, SJR 0,4)

Kategori Publikasi Jurnal Ilmiah (beri ✓pada kategori yang tepat)	:	√	~~Jurnal Ilmiah Internasional~~/Internasional Bereputasi
			Jurnal Ilmiah Nasional Terakreditasi
			Jurnal Ilmiah Nasional Tidak Terakreditasi

Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Reviewer		Nilai Rata-rata
	Reviewer I	Reviewer II	
a. Kelengkapan unsur isi jurnal (10%)	4,00	4,00	4,00
b. Ruang lingkup dan kedalaman pembahasan (30%)	12,00	11,50	11,75
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	11,90	11,50	11,70
d. Kelengkapan unsur dan kualitas penerbit (30%)	11,90	12,00	11,95
Total = (100%)			39,40
Nilai untuk Pengusul : 40% x 39,4 = 15,76			

Semarang, 8 Maret 2023

Reviewer 1

Prof. Dr. Rahmat Gernowo, M.Si
NIP. 196511231994031003
Unit Kerja: FSM Universitas Diponegoro
Bidang Ilmu: Fisika

Reviewer 2

Prof. Dr. Kusworo Adi, S.Si., M.T.
NIP. 197203171998021001
Unit Kerja: FSM Universitas Diponegoro
Bidang Ilmu: Fisika

LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
KARYA ILMIAH : JURNAL ILMIAH

Judul Jurnal Ilmiah (Artikel)	:	Quantum yield optimization of carbon dots using response surface methodology and its application as control of Fe3+ion levels in drinking water		
Nama/ Jumlah Penulis	:	3 Orang		
Status Pengusul	:	~~Penulis pertama~~/ ~~Penulis ke~~ / Penulis Korespondesi **		
Identitas Jurnal Ilmiah	:	a. Nama Jurnal	:	Material Research Express
		b. Nomor ISSN	:	2053-1591
		c. Vol, No., Bln Thn	:	Vol 9 No 1, Januari 2022 Hal 1-17
		d. Penerbit	:	IOP Publishing Ltd.
		e. DOI artikel (jika ada)	:	10.1088/2053-1591/ac3f60
		f. Alamat web jurnal	:	https://iopscience.iop.org/article/10.1088/2053-1591/ac3f60
		Alamat Artikel	:	https://iopscience.iop.org/article/10.1088/2053-1591/ac3f60/pdf
		g. Terindex	:	Scopus (Q2, SJR 0,4)

Kategori Publikasi Jurnal Ilmiah (beri ✓pada kategori yang tepat) :

- [√] ~~Jurnal Ilmiah Internasional~~/Internasional Bereputasi
- [ ] Jurnal Ilmiah Nasional Terakreditasi
- [ ] Jurnal Ilmiah Nasional Tidak Terakreditasi

Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Maksimal Jurnal Ilmiah			Nilai Akhir Yang Diperoleh
	Internasional [√]	Nasional Terakreditasi [ ]	Nasional Tidak Terakreditasi [ ]	
a. Kelengkapan unsur isi jurnal (10%)	4			4,00
b. Ruang lingkup dan kedalaman pembahasan (30%)	12			12,00
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	12			11,90
d. Kelengkapan unsur dan kualitas terbitan/jurnal (30%)	12			11,90
Total = (100%)	**40**			**39,80**
Nilai Pengusul = 40% x 39,8 = 15,92				

Catatan Penilaian artikel oleh Reviewer :

1. **Kelengkapan unsur isi jurnal:**
   Artikel telah ditulis sesuai dengan standar **Material Research Express, *sebuah jurnal Scopus*** Q3, SJR 0,33*Latar belakang memberikan dasar yang sangat kuat untuk mengemukakan sesuatu yang baru dalam artikel. . Kebaruan dari kajian ini dikemukakan dengan baik dan jelas.*
2. **Ruang lingkup dan kedalaman pembahasan:**
   Pembahasan dengan menggunakan metoda yang diusulkan dalam artikel cukup komprehensip. Diskusi telah dilakukan dengan para peneliti lain melalui referensi yang disitasi. Sebuah artikel yang menarik.
3. **Kecukupan dan kemutakhiran data/informasi dan metodologi:**
   Data dan referensi mutakhir, termasuk referensi dari kajian yang dilakukan oleh peneliti. Metoda standar dibidangnya dan akan bisa direfleksi oleh peneliti lain sebidang.
4. **Kelengkapan unsur dan kualitas terbitan:**
   Penerbitan sudah sangat bagus tertata rapi **Material Research Express *sebuah jurnal Scopus*** Q3, SJR 0,33, , *nilai maksimum 40*

Semarang, 1 Maret 2023
Reviewer 1

Prof. Dr. Drs. Rahmat Gernowo, M.Si.
NIP. 196511231994031003
Unit Kerja : Fisika
Bidang Ilmu: Fakultas Sains dan Matematika

LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU *PEER REVIEW*
KARYA ILMIAH : JURNAL ILMIAH

Judul Jurnal Ilmiah (Artikel)	:	Quantum yield optimization of carbon dots using response surface methodology and its application as control of Fe3+ion levels in drinking water		
Nama/ Jumlah Penulis	:	3 Orang		
Status Pengusul	:	~~Penulis pertama~~/ ~~Penulis ke~~ / Penulis Korespondesi **		
Identitas Jurnal Ilmiah	:	a. Nama Jurnal	:	Material Research Express
		b. Nomor ISSN	:	2053-1591
		c. Vol, No., Bln Thn	:	Vol 9 No 1, Januari 2022 Hal 1-17
		d. Penerbit	:	IOP Publishing Ltd.
		e. DOI artikel (jika ada)	:	10.1088/2053-1591/ac3f60
		f. Alamat web jurnal	:	https://iopscience.iop.org/article/10.1088/2053-1591/ac3f60
		Alamat Artikel	:	https://iopscience.iop.org/article/10.1088/2053-1591/ac3f60/pdf
		g. Terindex	:	Scopus (Q2, SJR 0,4)

Kategori Publikasi Jurnal Ilmiah (beri ✓pada kategori yang tepat) :

√	~~Jurnal Ilmiah Internasional~~/Internasional Bereputasi
	Jurnal Ilmiah Nasional Terakreditasi
	Jurnal Ilmiah Nasional Tidak Terakreditasi

Hasil Penilaian *Peer Review* :

Komponen Yang Dinilai	Nilai Maksimal Jurnal Ilmiah			Nilai Akhir Yang Diperoleh
	Internasional Bereputasi ☑	Nasional Terakreditasi ☐	Nasional Tidak Terakreditasi ☐	
a. Kelengkapan unsur isi jurnal (10%)	4			4,00
b. Ruang lingkup dan kedalaman pembahasan (30%)	12			11,50
c. Kecukupan dan kemutahiran data/informasi dan metodologi (30%)	12			11,50
d. Kelengkapan unsur dan kualitas terbitan/jurnal (30%)	12			12,00
Total = (100%)	**40**			**39,00**
Nilai Pengusul = 40% x 39,00 = 15,60				

Catatan Penilaian artikel oleh Reviewer :

1. **Kelengkapan unsur isi jurnal:** Penulisan artikel sudah baik dan mengikuti standard penulisan artikel di jurnal, yaitu Abstract, Introduction, Materials and Method, Result and Discussion, Conclusions, Acknowledgement and References. Substansi artikel sesuai bidang ilmu pengusul.
2. **Ruang lingkup dan kedalaman pembahasan:** Lingkup bahasan dari artikel ini adalah bidang fisika. Pembahasan cukup baik yaitu mengembangkan detektor ion logam berat dengan memanfaatkan sifat fluoresensi titik karbon. Cdots disintesis menggunakan metode iradiasi gelombang mikro berdasarkan desain komposit sentral: massa urea 0,31–3,68 gr; daya reaktor 200–1000 W; waktu sintesis adalah 13–46 menit, dan responsnya adalah hasil kuantum. Kedalaman pembahasan baik.
3. **Kecukupan dan kemutakhiran data/informasi dan metodologi:** Informasi yang disajikan cukup baru dan hasil yang diperoleh memuat substansi orisinil dengan aspek aplikasi yang penting. Sumber gagasan penulis untuk artikel ini banyak dan komprehensif. Dari 68 referensi yang dipakai hanya terdapat 1 paper yang lebih dari 10 tahun terakhir (out of date). Metodologinya baik dan penulisannya terstruktur.
4. **Kelengkapan unsur dan kualitas terbitan:** Artikel dimuat di Jurnal Material Research Express, pada Vol 9 No 1, Januari 2022 Hal 1-17. Diterbitkan oleh IOP Publishing Ltd.. Journal terindeks Scopus (Q2, SJR 0,4).

Semarang, 1 Maret 2023
Reviewer 2

Prof. Dr. Kusworo Adi, S.Si., M.T.
NIP. 197203171998021001
Bidang Ilmu: Fisika
Unit Kerja: Fakultas Sains dan Matematika

Materials Research Express • *Open Access* • Volume 9, Issue 1 • January 2022 • Article number 015702

Document type
Article • *Gold Open Access*

Source type
Journal

ISSN
20531591

DOI
10.1088/2053-1591/ac3f60

View more

Quantum yield optimization of carbon dots using response surface methodology and its application as control of Fe^{3+} ion levels in drinking water

Alkian, Ilham[a, b]; Sutanto, Heri[b, c] ; Hadiyanto[a]

Save all to author list

[a] Graduate Program of Environmental Science, School of Postgraduate Studies, Diponegoro University, Jawa Tengah, 50241, Indonesia

[b] Smart Materials Research Center (SMARC), Diponegoro University, Jawa Tengah, 50275, Indonesia

[c] Department of Physics, Faculty of Science and Mathematics, Diponegoro University, Jawa Tengah, 50275, Indonesia

Abstract

Early detection of heavy metals in drinking water is a fundamental step that must be taken to prevent

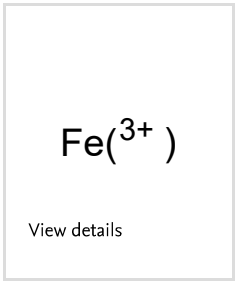
adverse effects on health. This research aims to develop a heavy metal ion detector by utilizing the fluorescence properties of carbon dots. Cdots were synthesized using the microwave irradiation method based on the central composite design: urea mass 0.31-3.68 gr; reactor power 200-1000 W; synthesis time is 13-46 min, and the response is quantum yield. Material characterization includes PL, TEM, UV-VIS, XRD, and FTIR. The selectivity and sensitivity of Cdots as detectors were tested for Ag+, Bi3+, Ni2+, Al3+, Co2+, Pb2+, Fe3+, Zn2+, Zr4+, and Hg2+ ions at concentrations of 0-10 µM. The results showed that Cdots were successfully synthesized by fluorescent light green at 544 nm. An adequate response model is quadratic with the formulation QY = +58.36 + 10.41X1 + 14.06X2 +13.59X3-5.57X2X3-4.89X12-8.60X22-5.40X32. The best Cdots were obtained in the formulation of R9 (3 g, 800 W, 40 min), which resulted in a QY of 74.39%. The characteristics of Cdots are spherical, diameter 6.6 nm, the bandgap of 2.53 eV, and having an amorphous structure. The surface of Cdots contains various functional groups such as O-H, C-H, C=O, C-N, and C=C. In the heavy metal detection test, Cdots showed specific sensitivity to Fe3+ ions. The addition of Fe3+ concentration and the extinction of Cdots fluorescence intensity formed a linear correlation F0/F = 0.08894[Fe3+]+0.99391 (R2 = 0.99276). The detection ability of Cdots for Fe3+ ions reaches a concentration of 0.016 ppm, much lower than the regulatory threshold limit of SNI, WHO, and IBWA. The detection of Fe3+ ions in drinking water uses a fluorescence technique consistent with the SSA and ICP-OES. Based on these results, the fluorescence technique using Cdots can be an instrument for quality control of the final drinking water product.

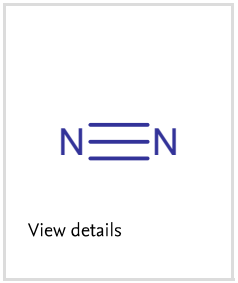
Author keywords

cdots; control of fe^{3+}; drinking water; fluorescence technique; heavy metal detection

Reaxys Chemistry database information

Substances View all substances (2)





Powered by Reaxys

Indexed keywords

Sustainable Development Goals 2022 New

SciVal Topics

Metrics

References (68) View in search results format >

All

Export Print E-mail Save to PDF Create bibliography

on references

Find more related documents in Scopus based on:

Authors > Keywords >

1 Suresh Kumar, K., Dahms, H.-U., Won, E.-J., Lee, J.-S., Shin, K.-H.

Microalgae - A promising tool for heavy metal remediation

(2015) *Ecotoxicology and Environmental Safety*, 113, pp. 329-352. Cited 512 times.
http://www.elsevier.com.proxy.undip.ac.id:2048/inca/publications/store/6/2/2/8/1/9/index.htt
doi: 10.1016/j.ecoenv.2014.12.019

View at Publisher

2 Qi, H., Teng, M., Liu, M., Liu, S., Li, J., Yu, H., Teng, C., (...), Guo, Z.

Biomass-derived nitrogen-doped carbon quantum dots: highly selective fluorescent probe for detecting Fe^{3+} ions and tetracyclines

(2019) *Journal of Colloid and Interface Science*, 539, pp. 332-341. Cited 327 times.
http://www.elsevier.com.proxy.undip.ac.id:2048/inca/publications/store/6/2/2/8/6/1/index.htt
doi: 10.1016/j.jcis.2018.12.047

View at Publisher

3 Ran, Y., Wang, S., Yin, Q., Wen, A., Peng, X., Long, Y., Chen, S.

Green synthesis of fluorescent carbon dots using chloroplast dispersions as precursors and application for Fe^{3+} ion sensing

(2020) *Luminescence*, 35 (6), pp. 870-876. Cited 15 times.
http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1522-7243
doi: 10.1002/bio.3794

View at Publisher

4 Bansod, B., Kumar, T., Thakur, R., Rana, S., Singh, I.

A review on various electrochemical techniques for heavy metal ions detection with different sensing platforms

(2017) *Biosensors and Bioelectronics*, 94, pp. 443-455. Cited 596 times.
www.elsevier.com/locate/bios
doi: 10.1016/j.bios.2017.03.031

View at Publisher

5 Adu, J.K., Fafanyo, D., Orman, E., Ayensu, I., Amengor, C.D.K., Kwofie, S.

Assessing metal contaminants in milled maize products available on the Ghanaian market with Atomic Absorption Spectrometry and Instrumental Neutron Activation Analyser techniques

(2020) *Food Control*, 109, art. no. 106912. Cited 8 times.
https://www-journals-elsevier-com.proxy.undip.ac.id/food-control
doi: 10.1016/j.foodcont.2019.106912

View at Publisher

6 Zhang, N., Li, Y., Xu, J., Li, J., Wei, B., Ding, Y., Amorim, I., (...), Liu, L.

High-Performance Flexible Solid-State Asymmetric Supercapacitors Based on Bimetallic Transition Metal Phosphide Nanocrystals

(2019) *ACS Nano*, 13 (9), pp. 10612-10621. Cited 156 times.
http://pubs.acs.org/journal/ancac3
doi: 10.1021/acsnano.9b04810

View at Publisher

7 Song, X., Zhang, R., Wang, Y., Feng, M., Zhang, H., Wang, S., Cao, J., (...), Xie, T.

Simultaneous determination of five metal ions by on-line complexion combined with micelle to solvent stacking in capillary electrophoresis

(2020) *Talanta*, 209, art. no. 120578. Cited 18 times.
https://www-journals-elsevier-com.proxy.undip.ac.id/talanta
doi: 10.1016/j.talanta.2019.120578

View at Publisher

8 Manousi, N., Gomez-Gomez, B., Madrid, Y., Deliyanni, E.A., Zachariadis, G.A.

Determination of rare earth elements by inductively coupled plasma-mass spectrometry after dispersive solid phase extraction with novel oxidized graphene oxide and optimization with response surface methodology and central composite design

(2020) *Microchemical Journal*, 152, art. no. 104428. Cited 34 times.
www.elsevier.com/inca/publications/store/6/2/0/3/9/1
doi: 10.1016/j.microc.2019.104428

View at Publisher

9 Kukkar, D., Vellingiri, K., Kumar, V., Deep, A., Kim, K.-H.

A critical review on the metal sensing capabilities of optically active nanomaterials: Limiting factors, mechanism, and performance evaluation

(2018) *TrAC - Trends in Analytical Chemistry*, 109, pp. 227-246. Cited 23 times.
www.elsevier.com/locate/trac
doi: 10.1016/j.trac.2018.09.009

View at Publisher

10 Long, C., Jiang, Z., Shangguan, J., Qing, T., Zhang, P., Feng, B.

Applications of carbon dots in environmental pollution control: A review

(2021) *Chemical Engineering Journal*, 406, art. no. 126848. Cited 137 times.
www.elsevier.com/inca/publications/store/6/0/1/2/7/3/index.htt
doi: 10.1016/j.cej.2020.126848

View at Publisher

11 Lewa, I.W.L., Sutanto, H., Subagio, A., Marhaendrajaya, I., Sugito, H.

Bright green fluorescence of microwave irradiation-synthesized Cdots as sensitive probe of iron (III)

(2019) *Materials Research Express*, 6 (10), art. no. 105703. Cited 5 times.
https://iopscience.iop.org/article/10.1088/2053-1591/ab3680/pdf
doi: 10.1088/2053-1591/ab3680

View at Publisher

12 Yoo, D., Park, Y., Cheon, B., Park, M.-H.

Carbon Dots as an Effective Fluorescent Sensing Platform for Metal Ion Detection (Open Access)

(2019) *Nanoscale Research Letters*, 14 (1), art. no. 272. Cited 118 times.
http://www.springer.com.proxy.undip.ac.id:2048/materials/nanotechnology/journal/11671
doi: 10.1186/s11671-019-3088-6

View at Publisher

13 Luo, L., Wang, P., Wang, Y., Wang, F.

pH assisted selective detection of Hg(II) and Ag(I) based on nitrogen-rich carbon dots

(2018) *Sensors and Actuators, B: Chemical*, 273, pp. 1640-1647. Cited 34 times.
doi: 10.1016/j.snb.2018.07.090

View at Publisher

14 Li, L., Yu, B., You, T.

Nitrogen and sulfur co-doped carbon dots for highly selective and sensitive detection of Hg (II) ions

(2015) *Biosensors and Bioelectronics*, 74, pp. 263-269. Cited 282 times.
www.elsevier.com/locate/bios
doi: 10.1016/j.bios.2015.06.050

View at Publisher

15 Pacquiao, M.R., de Luna, M.D.G., Thongsai, N., Kladsomboon, S., Paoprasert, P.

Highly fluorescent carbon dots from enokitake mushroom as multi-faceted optical nanomaterials for Cr^{6+} and VOC detection and imaging applications

(2018) *Applied Surface Science*, 453, pp. 192-203. Cited 109 times.
http://www.journals.elsevier.com.proxy.undip.ac.id:2048/applied-surface-science/
doi: 10.1016/j.apsusc.2018.04.199

View at Publisher

16 Hao, J., Liu, F., Liu, N., Zeng, M., Song, Y., Wang, L.

Ratiometric fluorescent detection of Cu^{2+} with carbon dots chelated Eu-based metal-organic frameworks

(2017) *Sensors and Actuators, B: Chemical*, 245, pp. 641-647. Cited 102 times.
doi: 10.1016/j.snb.2017.02.029

View at Publisher

17 Shahbazi, N., Zare-Dorabei, R.

A novel “off-on” fluorescence nanosensor for sensitive determination of sulfide ions based on carbon quantum dots and gold nanoparticles: Central composite design optimization

(2019) *Microchemical Journal*, 145, pp. 996-1002. Cited 41 times.
www.elsevier.com/inca/publications/store/6/2/0/3/9/1
doi: 10.1016/j.microc.2018.12.022

View at Publisher

18 Murugan, N., Prakash, M., Jayakumar, M., Sundaramurthy, A., Sundramoorthy, A.K.

Green synthesis of fluorescent carbon quantum dots from Eleusine coracana and their application as a fluorescence ‘turn-off’ sensor probe for selective detection of Cu $^{2+}$

(2019) *Applied Surface Science*, 476, pp. 468-480. Cited 117 times.
http://www.journals.elsevier.com.proxy.undip.ac.id:2048/applied-surface-science/
doi: 10.1016/j.apsusc.2019.01.090

View at Publisher

19 Zhu, H., Wang, X., Li, Y., Wang, Z., Yang, F., Yang, X.

Microwave synthesis of fluorescent carbon nanoparticles with electrochemiluminescence properties

(2009) *Chemical Communications*, (34), pp. 5118-5120. Cited 1096 times.
http://pubs.rsc.org/en/journals/journal/cc
doi: 10.1039/b907612c

View at Publisher

20 Rahmayanti, H D, Aji, M P, Sulhadi, S
(2015) *Unnes physics journal Unnes Phys. J*, 4, pp. 1-8. Cited 3 times.

21 Gu, D., Shang, S., Yu, Q., Shen, J.

Green synthesis of nitrogen-doped carbon dots from lotus root for Hg(II) ions detection and cell imaging

(2016) *Applied Surface Science*, 390, pp. 38-42. Cited 176 times.
http://www.journals.elsevier.com.proxy.undip.ac.id:2048/applied-surface-science/
doi: 10.1016/j.apsusc.2016.08.012

View at Publisher

22 Wang, Y., Hu, A.

Carbon quantum dots: Synthesis, properties and applications (Open Access)

(2014) *Journal of Materials Chemistry C*, 2 (34), pp. 6921-6939. Cited 1589 times.
http://pubs.rsc.org/en/journals/journalissues/tc
doi: 10.1039/c4tc00988f

View at Publisher

23 Li, L.-L., Ji, J., Fei, R., Wang, C.-Z., Lu, Q., Zhang, J.-R., Jiang, L.-P., (...), Zhu, J.-J.

A facile microwave avenue to electrochemiluminescent two-color graphene quantum dots

(2012) *Advanced Functional Materials*, 22 (14), pp. 2971-2979. Cited 737 times.
doi: 10.1002/adfm.201200166

View at Publisher

24 Liu, W., Diao, H., Chang, H., Wang, H., Li, T., Wei, W.

Green synthesis of carbon dots from rose-heart radish and application for Fe^{3+} detection and cell imaging

(2017) *Sensors and Actuators, B: Chemical*, 241, pp. 190-198. Cited 331 times.
doi: 10.1016/j.snb.2016.10.068

View at Publisher

25 Lu, F., Yang, S., Song, Y., Zhai, C., Wang, Q., Ding, G., Kang, Z.

Hydroxyl functionalized carbon dots with strong radical scavenging ability promote cell proliferation

(2019) *Materials Research Express*, 6 (6), art. no. 065030. Cited 14 times.
https://iopscience.iop.org/article/10.1088/2053-1591/ab0c55/pdf
doi: 10.1088/2053-1591/ab0c55

View at Publisher

26 Sutanto, H., Alkian, I., Romanda, N., Lewa, I.W.L., Marhaendrajaya, I., Triadyaksa, P.

High green-emission carbon dots and its optical properties: Microwave power effect (Open Access)

(2020) *AIP Advances*, 10 (5), art. no. 055008. Cited 16 times.
http://scitation.aip.org/content/aip/journal/adva
doi: 10.1063/5.0004595

View at Publisher

27 Patel, N H
Basic principle Working and Instrumentation of Experimental Techniques
(2015) *Sardar Patel University*, 2, pp. 57-101.
Chapter 2

28 Issa, M.A., Abidin, Z.Z., Sobri, S., Rashid, S.A., Mahdi, M.A., Ibrahim, N.A.

Fluorescent recognition of Fe^{3+} in acidic environment by enhanced-quantum yield N-doped carbon dots: optimization of variables using central composite design (Open Access)

(2020) *Scientific Reports*, 10 (1), art. no. 11710. Cited 34 times.
www.nature.com/srep/index.html
doi: 10.1038/s41598-020-68390-8

View at Publisher

29 Yang, G., Park, S.-J.

Conventional and microwave hydrothermal synthesis and application of functional materials: A review (Open Access)

(2019) *Materials*, 12 (7), art. no. 1177. Cited 185 times.
https://res.mdpi.com/materials/materials-12-01177/article_deploy/materials-12-01177.pdf?filename=&attachment=1
doi: 10.3390/ma12071177

View at Publisher

30 Issa, M.A., Abidin, Z.Z., Sobri, S., Rashid, S., Mahdi, M.A., Ibrahim, N.A., Pudza, M.Y.

Facile synthesis of nitrogen-doped carbon dots from lignocellulosic waste (Open Access)

(2019) *Nanomaterials*, 9 (10), art. no. 1500. Cited 40 times.
https://www.mdpi.com/2079-4991/9/10/1500/pdf
doi: 10.3390/nano9101500

View at Publisher

31 Zhang, Y., He, Y.H., Cui, P.P., Feng, X.T., Chen, L., Yang, Y.Z., Liu, X.G.

Water-soluble, nitrogen-doped fluorescent carbon dots for highly sensitive and selective detection of Hg^{2+} in aqueous solution

(2015) *RSC Advances*, 5 (50), pp. 40393-40401. Cited 112 times.
http://pubs.rsc.org/en/journals/journal/ra
doi: 10.1039/c5ra04653j

View at Publisher

32 Barati, A., Shamsipur, M., Arkan, E., Hosseinzadeh, L., Abdollahi, H.

Synthesis of biocompatible and highly photoluminescent nitrogen doped carbon dots from lime: Analytical applications and optimization using response surface methodology

(2015) *Materials Science and Engineering C*, 47, pp. 325-332. Cited 95 times.
doi: 10.1016/j.msec.2014.11.035

View at Publisher

33 Isnaeni, Herbani, Y., Suliyanti, M.M.

Concentration effect on optical properties of carbon dots at room temperature

(2018) *Journal of Luminescence*, 198, pp. 215-219. Cited 33 times.
doi: 10.1016/j.jlumin.2018.02.012

View at Publisher

34 Li, L., Dong, T.

Photoluminescence tuning in carbon dots: Surface passivation or/and functionalization, heteroatom doping

(2018) *Journal of Materials Chemistry C*, 6 (30), pp. 7944-7970. Cited 217 times.
http://pubs.rsc.org/en/journals/journal/tc
doi: 10.1039/c7tc05878k

View at Publisher

35 Fatimah, S., Bilqis, S.M., Isnaeni, Tahir, D.

Luminescence properties of carbon dots synthesis from sugar for enhancing glows in paints

(2019) *Materials Research Express*, 6 (9), art. no. 095006. Cited 9 times.
https://iopscience.iop.org/article/10.1088/2053-1591/ab2bb7/pdf
doi: 10.1088/2053-1591/ab2bb7

View at Publisher

36 Permatasari, F.A., Fukazawa, H., Ogi, T., Iskandar, F., Okuyama, K.

Design of Pyrrolic-N-Rich Carbon Dots with Absorption in the First Near-Infrared Window for Photothermal Therapy

(2018) *ACS Applied Nano Materials*, 1 (5), pp. 2368-2375. Cited 71 times.
https://pubs.acs.org/journal/aanmf6
doi: 10.1021/acsanm.8b00497

View at Publisher

37 Yu, T., Wang, H., Guo, C., Zhai, Y., Yang, J., Yuan, J.

A rapid microwave synthesis of green-emissive carbon dots with solid-state fluorescence and pH-sensitive properties (Open Access)

(2018) *Royal Society Open Science*, 5 (7), art. no. 180245. Cited 37 times.
rsos.royalsocietypublishing.org/
doi: 10.1098/rsos.180245

View at Publisher

38 Li, H., Kang, Z., Liu, Y., Lee, S.-T.

Carbon nanodots: Synthesis, properties and applications

(2012) *Journal of Materials Chemistry*, 22 (46), pp. 24230-24253. Cited 2172 times.
doi: 10.1039/c2jm34690g

View at Publisher

39 Yeh, T.-F., Huang, W.-L., Chung, C.-J., Chiang, I.-T., Chen, L.-C., Chang, H.-Y., Su, W.-C., (...), Teng, H.

Elucidating Quantum Confinement in Graphene Oxide Dots Based on Excitation-Wavelength-Independent Photoluminescence

(2016) *Journal of Physical Chemistry Letters*, 7 (11), pp. 2087-2092. Cited 130 times.
http://pubs.acs.org/journal/jpclcd
doi: 10.1021/acs.jpclett.6b00752

View at Publisher

40 Yuan, F., Wang, Z., Li, X., Li, Y., Tan, Z., Fan, L., Yang, S.

Bright Multicolor Bandgap Fluorescent Carbon Quantum Dots for Electroluminescent Light-Emitting Diodes

(2017) *Advanced Materials*, 29 (3), art. no. 1604436. Cited 568 times.
http://www3.interscience.wiley.com/journal/119030556/issue
doi: 10.1002/adma.201604436

View at Publisher

41 Tu, Y.J., Tian, Y.H., Yang, Y.L.

High-sensitivity and selectivity detection of permanganate ions based on pig liver-based carbon quantum dots
(Open Access)

(2019) *Applied Ecology and Environmental Research*, 17 (4), pp. 7249-7263. Cited 14 times.
http://aloki.hu/pdf/1704_72497263.pdf
doi: 10.15666/aeer/1704_72497263

View at Publisher

42 Zhao, C., Li, X., Cheng, C., Yang, Y.

Green and microwave-assisted synthesis of carbon dots and application for visual detection of cobalt(II) ions and pH sensing

(2019) *Microchemical Journal*, 147, pp. 183-190. Cited 77 times.
www.elsevier.com/inca/publications/store/6/2/0/3/9/1
doi: 10.1016/j.microc.2019.03.029

View at Publisher

43 Yang, R., Guo, X., Jia, L., Zhang, Y., Zhao, Z., Lonshakov, F.

Green preparation of carbon dots with mangosteen pulp for the selective detection of Fe $^{3+}$ ions and cell imaging

(2017) *Applied Surface Science*, 423, pp. 426-432. Cited 77 times.
http://www.journals.elsevier.com.proxy.undip.ac.id:2048/applied-surface-science/
doi: 10.1016/j.apsusc.2017.05.252

View at Publisher

44 Wang, B., Hu, E., Tu, Z., David, K.D., Hu, K., Hu, X., Yang, W., (...), Zhang, H.

Characterization and tribological properties of rice husk carbon nanoparticles Co-doped with sulfur and nitrogen

(2018) *Applied Surface Science*, 462, pp. 944-954. Cited 29 times.
http://www.journals.elsevier.com.proxy.undip.ac.id:2048/applied-surface-science/
doi: 10.1016/j.apsusc.2018.08.165

View at Publisher

45 Tian, M., Liu, Y., Wang, Y., Zhang, Y.

Yellow-emitting carbon dots for selective detecting 4-NP in aqueous media and living biological imaging

(2019) *Spectrochimica Acta - Part A: Molecular and Biomolecular Spectroscopy*, 220, art. no. 117117. Cited 25 times.
doi: 10.1016/j.saa.2019.05.022

View at Publisher

46 Yan, F., Sun, Z., Zhang, H., Sun, X., Jiang, Y., Bai, Z.

The fluorescence mechanism of carbon dots, and methods for tuning their emission color: a review

(2019) *Microchimica Acta*, 186 (8), art. no. 583. Cited 201 times.
http://www.springer/at/mca
doi: 10.1007/s00604-019-3688-y

View at Publisher

47 Yang, X., Zhuo, Y., Zhu, S., Luo, Y., Feng, Y., Dou, Y.

Novel and green synthesis of high-fluorescent carbon dots originated from honey for sensing and imaging

(2014) *Biosensors and Bioelectronics*, 60, pp. 292-298. Cited 327 times.
www.elsevier.com/locate/bios
doi: 10.1016/j.bios.2014.04.046

View at Publisher

48 Sun, C., Zhang, Y., Wang, P., Yang, Y., Wang, Y., Xu, J., Wang, Y., (...), Yu, W.W.

Synthesis of Nitrogen and Sulfur Co-doped Carbon Dots from Garlic for Selective Detection of Fe^{3+} (Open Access)

(2016) *Nanoscale Research Letters*, 11 (1), art. no. 110, pp. 1-9. Cited 131 times.
http://www.springer.com.proxy.undip.ac.id:2048/materials/nanotechnology/journal/11671
doi: 10.1186/s11671-016-1326-8

View at Publisher

49 Dineshkumar, R., Murugan, N., Abisha Rani, J.M., Arthanareeswari, M., Kamaraj, P., Devikala, S., Duraisamy, N., (...), Sundramoorthy, A.K.

Synthesis of highly fluorescent carbon dots from Plectranthus amboinicus as a fluorescent sensor for Ag^{+} ion

(2019) *Materials Research Express*, 6 (10), art. no. 104006. Cited 9 times.
https://iopscience.iop.org/article/10.1088/2053-1591/ab3a7b/pdf
doi: 10.1088/2053-1591/ab3a7b

View at Publisher

50 Iqbal, A., Tian, Y., Wang, X., Gong, D., Guo, Y., Iqbal, K., Wang, Z., (...), Qin, W.

Carbon dots prepared by solid state method via citric acid and 1,10-phenanthroline for selective and sensing detection of Fe^{2+} and Fe^{3+}

(2016) *Sensors and Actuators, B: Chemical*, 237, pp. 408-415. Cited 134 times.
doi: 10.1016/j.snb.2016.06.126

View at Publisher

51 Zu, F., Yan, F., Bai, Z., Xu, J., Wang, Y., Huang, Y., Zhou, X.

The quenching of the fluorescence of carbon dots: A review on mechanisms and applications

(2017) *Microchimica Acta*, 184 (7), pp. 1899-1914. Cited 686 times.
http://www.springer/at/mca
doi: 10.1007/s00604-017-2318-9

View at Publisher

52 Ding, H., Wei, J.-S., Xiong, H.-M.

Nitrogen and sulfur co-doped carbon dots with strong blue luminescence

(2014) *Nanoscale*, 6 (22), pp. 13817-13823. Cited 441 times.
http://www.rsc.org/publishing/journals/NR/Index.asp
doi: 10.1039/c4nr04267k

View at Publisher

53 Aslandaş, A.M., Balci, N., Arik, M., Şakiroğlu, H., Onganer, Y., Meral, K.

Liquid nitrogen-assisted synthesis of fluorescent carbon dots from Blueberry and their performance in Fe $^{3+}$ detection

(2015) *Applied Surface Science*, 356, pp. 747-752. Cited 99 times.
http://www.journals.elsevier.com.proxy.undip.ac.id:2048/applied-surface-science/
doi: 10.1016/j.apsusc.2015.08.147

View at Publisher

54 Liu, M., Xu, Y., Niu, F., Gooding, J.J., Liu, J.

Carbon quantum dots directly generated from electrochemical oxidation of graphite electrodes in alkaline alcohols and the applications for specific ferric ion detection and cell imaging

(2016) *Analyst*, 141 (9), pp. 2657-2664. Cited 155 times.
http://pubs.rsc.org/en/journals/journal/an
doi: 10.1039/c5an02231b

View at Publisher

55 Gao, X., Du, C., Zhuang, Z., Chen, W.

Carbon quantum dot-based nanoprobes for metal ion detection

(2016) *Journal of Materials Chemistry C*, 4 (29), pp. 6927-6945. Cited 358 times.
http://pubs.rsc.org/en/journals/journalissues/tc
doi: 10.1039/c6tc02055k

View at Publisher

56 Khan, W.U., Wang, D., Zhang, W., Tang, Z., Ma, X., Ding, X., Du, S., (...), Wang, Y.

High quantum yield green-emitting carbon dots for Fe(III) detection, biocompatible fluorescent ink and cellular imaging (Open Access)

(2017) *Scientific Reports*, 7 (1), art. no. 14866. Cited 110 times.
www.nature.com/srep/index.html
doi: 10.1038/s41598-017-15054-9

View at Publisher

57 Atchudan, R., Edison, T.N.J.I., Chakradhar, D., Perumal, S., Shim, J.-J., Lee, Y.R.

Facile green synthesis of nitrogen-doped carbon dots using Chionanthus retusus fruit extract and investigation of their suitability for metal ion sensing and biological applications

(2017) *Sensors and Actuators, B: Chemical*, 246, pp. 497-509. Cited 223 times.
doi: 10.1016/j.snb.2017.02.119

View at Publisher

58 Atchudan, R., Edison, T.N.J.I., Aseer, K.R., Perumal, S., Karthik, N., Lee, Y.R.

Highly fluorescent nitrogen-doped carbon dots derived from Phyllanthus acidus utilized as a fluorescent probe for label-free selective detection of Fe^{3+} ions, live cell imaging and fluorescent ink

(2018) *Biosensors and Bioelectronics*, 99, pp. 303-311. Cited 439 times.
www.elsevier.com/locate/bios
doi: 10.1016/j.bios.2017.07.076

View at Publisher

59 Murugan, N., Sundramoorthy, A.K.

Green synthesis of fluorescent carbon dots from Borassus flabellifer flowers for label-free highly selective and sensitive detection of Fe^{3+} ions

(2018) *New Journal of Chemistry*, 42 (16), pp. 13297-13307. Cited 56 times.
http://pubs.rsc.org/en/journals/journal/nj
doi: 10.1039/c8nj01894d

View at Publisher

60 Radhakrishnan, K., Panneerselvam, P., Marieeswaran, M.

A green synthetic route for the surface-passivation of carbon dots as an effective multifunctional fluorescent sensor for the recognition and detection of toxic metal ions from aqueous solution

(2019) *Analytical Methods*, 11 (4), pp. 490-506. Cited 41 times.
http://pubs.rsc.org/en/journals/journal/ay
doi: 10.1039/c8ay02451k

View at Publisher

61 Gao, X., Zhou, X., Ma, Y., Qian, T., Wang, C., Chu, F.

Facile and cost-effective preparation of carbon quantum dots for Fe $^{3+}$ ion and ascorbic acid detection in living cells based on the “on-off-on” fluorescence principle

(2019) *Applied Surface Science*, 469, pp. 911-916. Cited 80 times.
http://www.journals.elsevier.com.proxy.undip.ac.id:2048/applied-surface-science/
doi: 10.1016/j.apsusc.2018.11.095

View at Publisher

62 Sailaja Prasannakumaran Nair, S., Kottam, N., S G, P.K.

Green Synthesized Luminescent Carbon Nanodots for the Sensing Application of Fe^{3+} Ions

(2020) *Journal of Fluorescence*, 30 (2), pp. 357-363. Cited 21 times.
http://www.kluweronline.com/issn/1053-0509
doi: 10.1007/s10895-020-02505-2

View at Publisher

63 Zhou, J., Ge, M., Han, Y., Ni, J., Huang, X., Han, S., Peng, Z., (...), Li, S.
Preparation of Biomass-Based Carbon Dots with Aggregation Luminescence Enhancement from Hydrogenated Rosin for Biological Imaging and Detection of Fe^{3+} (Open Access)

(2020) *ACS Omega*, 5 (20), pp. 11842-11848. Cited 16 times.
pubs.acs.org/journal/acsodf
doi: 10.1021/acsomega.0c01527

View at Publisher

64 Ding, S., Gao, Y., Ni, B., Yang, X.
Green synthesis of biomass-derived carbon quantum dots as fluorescent probe for Fe^{3+} detection

(2021) *Inorganic Chemistry Communications*, 130, art. no. 108636. Cited 33 times.
http://www.journals.elsevier.com.proxy.undip.ac.id:2048/inorganic-chemistry-communications/
doi: 10.1016/j.inoche.2021.108636

View at Publisher

65 Li, H., Zheng, T., Zhao, Y., Xu, Z., Dai, X., Shao, Z.
Multiresponsive polysiloxane bearing spiropyran: Synthesis and sensing of pH and metal ions of different valence

(2018) *Materials Research Express*, 5 (3), art. no. 035301. Cited 7 times.
http://iopscience.iop.org/article/10.1088/2053-1591/aab11e/pdf
doi: 10.1088/2053-1591/aab11e

View at Publisher

66 Adhani, R, Husaini, H
(2017) *Logam Berat Sekitar Manusia Edisi*, 2, pp. 29-143.
(Banjarmasin: Lambung Mangkurat University Press)

67 Herschy, R.W.
Water quality for drinking: WHO guidelines

(2012) *Encyclopedia of Earth Sciences Series*, pp. 876-883. Cited 53 times.
www.springer.com/series/5898
doi: 10.1007/978-1-4020-4410-6_184

View at Publisher

68 Rohmawati, Y, Kustomo, K
Analisis kualitas air pada reservoir PDAM kota semarang menggunakan uji parameter fisika, kimia, dan mikrobiologi, serta dikombinasikan dengan analisis kemometri Walisongo
(2020) *J. Chem*, 3, p. 100.

Sutanto, H.; Smart Materials Research Center (SMARC), Diponegoro University, Jawa Tengah, Indonesia; email:herisutanto@live.undip.ac.id

Source details

Materials Research Express

Open Access

Scopus coverage years: from 2014 to Present

Publisher: Institute of Physics Publishing

E-ISSN: 2053-1591

Subject area: Materials Science: Metals and Alloys | Materials Science: Polymers and Plastics | Materials Science: Surfaces, Coatings and Films | View all

Source type: Journal

CiteScore 2021
3.8

SJR 2021
0.402

SNIP 2021
0.579

View all documents > | Set document alert | Save to source list | Source Homepage

CiteScore | CiteScore rank & trend | Scopus content coverage

Improved CiteScore methodology

CiteScore 2021 counts the citations received in 2018-2021 to articles, reviews, conference papers, book chapters and data papers published in 2018-2021, and divides this by the number of publications published in 2018-2021. Learn more >

CiteScore 2021

$$3.8 = \frac{37{,}333 \text{ Citations 2018 - 2021}}{9{,}896 \text{ Documents 2018 - 2021}}$$

Calculated on 05 May, 2022

CiteScoreTracker 2022

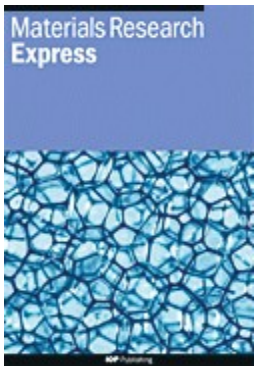
$$5.0 = \frac{43{,}037 \text{ Citations to date}}{8{,}652 \text{ Documents to date}}$$

Last updated on 05 March, 2023 • Updated monthly

CiteScore rank 2021

Category	Rank	Percentile
Materials Science — Metals and Alloys	#39/155	75th
Materials Science — Polymers and Plastics	#62/154	60th
Materials Science — Surfaces, Coatings	#53/129	59th

View CiteScore methodology > | CiteScore FAQ > | Add CiteScore to your site



An open access, rapid peer-review journal publishing high quality research on the design, fabrication, properties and applications of all classes of materials.

Register your details to be kept updated.

Submit an article

Track my article

Current volume

Number 3, March 2023 Go

Journal archive

Vol 10, 2023 Go

3 days
Median submission to first decision before peer review

21 days
Median submission to first decision after peer review

2.025
Impact factor

3.8
Citescore

Full list of journal metrics

Most read

Latest articles

Review articles

Accepted manuscripts

Trending

Table of contents

Volume 9

Number 1, January 2022

Previous issue Next issue

Open all abstracts

Topical Reviews

Papers

Nanomaterials and nanostructures

OPEN ACCESS 015502

Oxidation of soot promoted by Fe-based spinel catalysts

Haoming Chen, Tianle Li, Zhiming Xu, Wenju Wang and Haihou Wang

+ Open abstract View article PDF

OPEN ACCESS 015503

The influence of target film material and coating on neutron yield and sputtering yield

Jiaxi Liu, Jingbin Lu, Xu Xu, Chengqian Li, Yu Wang and Haotengjiao He

+ Open abstract View article PDF

OPEN ACCESS 015504

CO_2 capture by alcohol ammonia based deep eutectic solvents with different water content

Xiangwei Liu, Qian Ao, Shengyou Shi and Shuie Li

+ Open abstract View article PDF

OPEN ACCESS 015505

Physical and dynamic mechanical properties of continuous bamboo reinforcement/bio-based epoxy composites

Tutea Richmond, Louise Lods, Jany Dandurand, Eric Dantras, Colette Lacabanne, Samuel Malburet, Alain Graillot, Jean-Michel Durand, Edouard Sherwood and Philippe Ponteins

+ Open abstract View article PDF

OPEN ACCESS 015506

Degradation mechanism and life prediction of tailings and waste rock aggregate geopolymer concrete under freeze-thaw corrosion

Qi Sun, Botao Li, Hui Wang and Yiting Wang

+ Open abstract View article PDF

Smart materials

OPEN ACCESS 015701

A phenomenological theory-based viscosity model for shear thickening fluids

Kun Lin, Jiapeng Qi, Hongjun Liu, Minghai Wei and Huayi Peng

+ Open abstract View article PDF

OPEN ACCESS 015702

Quantum yield optimization of carbon dots using response surface methodology and its application as control of Fe^{3+}ion levels in drinking water

Ilham Alkian, Heri Sutanto and Hadiyanto

+ Open abstract View article PDF

Magnetic materials

OPEN ACCESS 016101

Doping dependent electronic and magnetic ordering in mixed-valent $La_{1-x}Sr_xMnO_3$ thin films

J A Payne, C T Bryant, R Marquez Tavera, D T Brown, T M Pekarek and M P Warusawithana

+ Open abstract View article PDF

Photonic materials

OPEN ACCESS 016201

Super-resolution imaging of negative-refractive graded-index photonic crystal flat lens

Binming Liang, Xiao Huang and Jihong Zheng

+ Open abstract View article PDF

OPEN ACCESS 016202

Fabry-Perot interference pattern scattered by a sub-monolayer array of nanoparticles

R M Osgood III, Y Ait-El-Aoud, K Bullion, S Dinneen, R Kingsborough, M Rothschild and S Kooi

+ Open abstract View article PDF

Electronic materials

OPEN ACCESS 016301

Negative series resistance and photo-response properties of Au/PPY-MWCNTs composite/TiO_2/Al_2O_3/n-Si/Al photodiode

A Ashery, A E H Gaballah and Emad M Ahmed

+ Open abstract View article PDF

OPEN ACCESS 016302

Effects of Ta_2O_5 on the microstructure and electrical properties of ZnO linear resistance ceramics

Meizhen Zhuo, Chun-e Huang, Changzhi Zhao, Jiongjiong Yin and Chunying Shen

+ Open abstract View article PDF

OPEN ACCESS 016303

High-conductivity flexible Ag films formed by low-temperature and short-time sintering of PVP-modified silver oxalate composite ink

Ukraine: Click here to read IOP Publishing's statement

Editorial board

Back to top

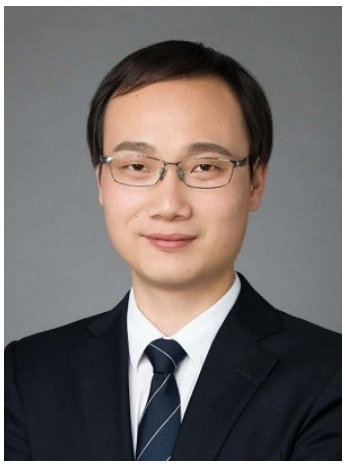
Editorial board

The Editor-in-Chief of *Materials Research Express* provides leadership and management of the Editorial Boards and influences the strategy of the Journal, in co-operation with the Publisher.

The Editorial Boards consist of an Executive Editorial Board, focusing on advocacy and commissioning, and a non-executive Editorial Board, focusing on advocacy and peer review, with membership of both Editorial Boards comprising groups of prominent scientists in the Journal's field. The role of the Editorial Boards is to act as ambassadors for the Journal and IOPP; to foster strong and loyal relationships between the Journal and the scientific community and to channel community feedback to IOPP.

Materials Research Express also has an **advisory panel.**

Editors-in-Chief



Yi Cao, Nanjing University, China

Dr Yi Cao received his bachelor's degree in 2001 and Master's degree (Supervisor: Prof.

Xiqun Jiang) in 2004 from Nanjing University. He then obtained his PhD in 2009 from the University of British Columbia (Supervisor: Prof. Hongbin Li). After a one-year postdoc at the same place, he started his independent career at the Department of Physics, Nanjing University as a full professor in 2010. His work was recognized by several awards including the 2014 IUPAP Young Scientist Prize in Biological Physics, the 2018 Young Innovator Award in Nanobiotechnology by Nano Research, and the 2019 Young Scientist Award from the Biomedical Polymer Materials Division of the Chinese Society for Biomaterials.

Judy Wu, University of Kansas, USA

Dr Judy Wu is a Distinguished Professor of Physics at the University of Kansas. She received her PhD from the University of Houston. She is an experimental condensed matter physicist and is specialized in fabrication, characterization and device applications of thin films and nanostructures. Her current research focuses on understanding the interfaces in ultrathin metal-insulator-metal tunnel junctions including Josephson tunnel junctions, magnetic tunnel junctions, memristors for quantum and neuromorphic computing, and in graphene-based heterostructures nanohybrids quantum sensors including photodetectors, strain/bio/gas/chemical sensors.

Executive Editorial Board

Sarbajit Banerjee, Texas A&M University, College Station, TX, USA

Israel Felner, The Hebrew University of Jerusalem, Jerusalem, Israel

Mariana Fraga, Federal University of São Paulo, UNIFESP, São José dos Campos, Brazil

D D Sarma, Indian Institute of Science, Bangalore, India

Editorial Board

Ali Zolfagharian, Deakin University, Australia

J. Paulo Davim, Universidade de Aveiro, Portugal

Marco Alfano, University of Waterloo, Canada

Fei Sun, Hong Kong University of Science and Technology, China

Maria Chatzinikolaidou, University of Crete, Greece

Hamdi Torun, Northumbria University, UK

Sheng Guo, Chalmers University of Technology, Sweden

Chuantong Chen, Osaka University, Japan

Way Foong Lim, Universiti Sains Malaysia, Malaysia

Marie-Christine Record, Aix Marseille University, France

Ajeet K. Kaushik, Florida Polytechnic University, USA

Back to top

IOPscience Journals

Books

About IOPscience

Contact us

Developing countries access

IOP Publishing open access information

Materials Research Express

PAPER

Doping dependent electronic and magnetic ordering in mixed-valent $La_{1-x}Sr_xMnO_3$ thin films

J A Payne, C T Bryant, R Marquez Tavera, D T Brown, T M Pekarek and M P Warusawithana*

Department of Physics, University of North Florida, Jacksonville, FL 32224, United States of America

* Author to whom any correspondence should be addressed.

E-mail: maitriw@unf.edu

Keywords: colossal magnetoresistive oxides, epitaxial thin films, molecular beam epitaxy, electronic and magnetic order, doped manganites

OPEN ACCESS

RECEIVED
3 November 2021

REVISED
30 December 2021

ACCEPTED FOR PUBLICATION
31 December 2021

PUBLISHED
7 January 2022

Abstract

We have investigated the collective electronic and magnetic orderings of a series of $La_{1-x}Sr_xMnO_3$ thin films grown epitaxially strained to (001) oriented strontium titanate substrates as a function of doping, x, for $0 \leqslant x \leqslant 0.4$. We find that the ground states of these crystalline thin films are, in general, consistent with that observed in bulk crystals and thin film samples synthesized under a multitude of techniques. Our systematic study, however, reveal subtle features in the temperature dependent electronic transport and magnetization measurements, which presumably arise due to Jahn-Teller type distortions in the lattice for particular doping levels. For the parent compound $LaMnO_3$ ($x = 0$), we report evidence of a strain-induced ferromagnetic ordering in contrast to the antiferromagnetic ground state found in bulk crystals.

1. Introduction

The mixed valent manganites are an interesting class of materials due to their strongly correlated electronic and magnetic orderings [1, 2]. In this study, we focus on $La_{1-x}Sr_xMnO_3$ (LSMO) crystalline thin films grown in the perovskite ABO_3 crystal structure where the La and Sr atoms occupy the A-site and the Mn atoms occupy the B-site. The dependence of the electronic and magnetic orderings on doping given by x, the ratio of [Sr]/([La]+[Sr]), has been studied in bulk single crystals [3–6]. Furthermore, in both bulk and thin film form the colossal magnetoresistive (CMR) effect in this material around $x = 0.3$ doping has also been studied extensively over the past three decades [1, 2, 7]. In thin film form, the studies around x = 0.3 doping have also included probing the use of epitaxial strain imparted by a substrate [8–10] and the synthesis of atomically ordered superlattice structures [11–13] to control and manipulate the magnetic order. Here we conduct a systematic study probing the electronic and magnetic orderings in a series of identically prepared thin films as a function of doping, x.

In the parent compound $LaMnO_3$ ($x = 0$), the electron configuration of Mn^{3+} is $3d^4$: t_{2g}^3 e_g^1, and due to ordering of the e_g orbitals, cooperative Jahn-Teller distortions arise [2]. By substituting some La^{3+} with Sr^{2+}, Mn^{4+} is created and holes are introduced in the e_g band corresponding to x, the amount of Sr content. At $0.17 < x < 0.5$ the resulting materials are typically conducting ferromagnets [1, 2]: the mobile e_g electrons mediate a ferromagnetic interaction between neighboring Mn^{3+} and Mn^{4+} sites, which is known as the double exchange interaction.

LSMO films around $x = 0.3$ doping have also been explored for potential device applications like magnetic tunnel junctions and spin valves [14–16], given that the double exchange interaction suggests a nearly spin polarized half metal [14, 15, 17]. Here we systematically explore the doping dependence of correlated electronic and magnetic orderings in strained epitaxial thin films of $La_{1-x}Sr_xMnO_3$.

2. Experimental details

The samples used in this study were grown using ozone-assisted Molecular Beam Epitaxy (MBE) [18]. By this method, LSMO films were grown one molecular layer (ML) at a time, with dopings of $x = 0.00, 0.04, 0.17, 0.20, 0.33$

Materials Research Express

PAPER

A phenomenological theory-based viscosity model for shear thickening fluids

Kun Lin[1], **Jiapeng Qi**[1], **Hongjun Liu**[1], **Minghai Wei**[2] and **Huayi Peng**[1]

[1] School of Civil and Environmental Engineering, Harbin Institute of Technology, Shenzhen, People's Republic of China
[2] Department of Construction and Engineering Management, Shenyang Jianzhu University, Shenyang, People's Republic of China

E-mail: penghuayi@hit.edu.cn

Keywords: shear thickening fluids, phenomenological theory, viscosity model, levenberg–marquardt algorithm, logistic function

OPEN ACCESS

RECEIVED
11 November 2021

REVISED
18 December 2021

ACCEPTED FOR PUBLICATION
29 December 2021

PUBLISHED
7 January 2022

Abstract

A viscosity model for shear thickening fluids (STFs) based on phenomenological theory is proposed. The model considers three characteristic regions of the typical material properties of STFs: a shear thinning region at low shear rates, followed by a sharp increase in viscosity above the critical shear rate, and subsequently a significant failure region at high shear rates. The typical S-shaped characteristic of the STF viscosity curve is represented using the logistic function, and suitable constraints are applied to satisfy the continuity of the viscosity model. Then, the Levenberg–Marquardt algorithm is introduced to fit the constitutive model parameters based on experimental data. Verification against experimental data shows that the model can predict the viscosity behavior of STF systems composed of different materials with different mass concentrations and temperatures. The proposed viscosity model provides a calculation basis for the engineering applications of STFs (e.g., in increasing impact resistance and reducing vibration).

1. Introduction

Granular matter systems are complex systems that exist in nature and are encountered in everyday life. Research on the rheology of granular matter systems has long been of high scientific significance and industrial application value (Waitukaitis and Jaeger 2012). A shear thickening fluid (STF), a type of granular matter system, is a concentrated particle suspension formed by dispersing nano- or microscale particles in a polar medium. Under appropriate shear conditions, the viscosity of an STF increases rapidly and significantly (typically by several orders of magnitude) with increasing shear rate. This process is reversible; that is, when the stress is removed, the fluid returns to its original state. Under a high-speed impact, an STF may even change from a liquid state to a solid state (Barnes 1989, Boersma *et al* 1990).

STFs are widely used in the fields of personal protection, impact resistance, and structural vibration reduction due to their unique nonlinear mechanical response and good energy absorption performance. Lee *et al* (2003) studied STF–Kevlar composites and demonstrated that STF significantly enhances the ballistic performance of fabrics. Gong *et al* (2013) studied the impact resistance of STF-treated Kevlar fibers and found that STF significantly improves the impact resistance of Kevlar fibers. Park *et al* (2015) studied STF composite fiber fabrics under high-speed impact through experiments and finite-element models and showed that the frictional behavior of the STF particles is the main energy absorption mechanism. Fischer and colleagues (Fischer *et al* 2006, Fischer *et al* 2010) have applied STF to sandwich beams and found that when the vibration amplitude exceeds the critical vibration amplitude, the relative motion of the sandwich beam causes the shear thickening of the STF in the beam, thereby improving the structural damping performance. Zhang *et al* (2008a) designed a single-bar STF damper, studied its dynamic mechanical properties, and showed that such a damper can achieve dual control over stiffness and vibration damping under different frequency dynamic loading conditions. Lin and colleagues (Lin *et al* 2018, Wei *et al* 2019, Lin *et al* 2020) have designed a full-scale STF damper and experimentally examined its energy dissipation and dynamic properties; their damper exhibits both viscous and frictional behavior, which substantially benefits vibration control under varying loads.