Books/Chapters Published : 2021-22

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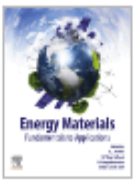
Energy Materials
Fundamentals to Applications
2021, Pages 335-371



Chapter 12 - Li-S ion batteries: a substitute for Li-ion storage batteries

Kalpana R. Nagde [1], S.J. Dhoble [2]

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https://doi.org/10.1016/B978-0-12-823710-6.00008-X ↗

Abstract

Nowaday's, most researchers have focused their attention on the variety of rechargeable batteries. The Li-ion battery is considered to be the best among all the available batteries due to its superior advantages and performance. In view of this, this chapter deals with the basics of batteries, with an emphasis on the Li-ion battery. Because global warming is an increasingly pressing problem, researchers all over the world are searching for new technologies that will help them to counteract the effects of global warming. Manufacturing of the lithium–sulfur (Li-S) battery is a big step toward the solution to this. In-depth developments in Li-ion and Li–S batteries include historical progress, technical difficulties, and material adaptation, which are described here in detail. Moreover, the different component materials used so far are described in detail, which includes a detailed understanding of the kinematics involved in battery chemistry. Research into developing high-performance Li-S batteries is also explained in detail. The various types of materials used as electrodes and electrolytes in batteries, based on their mechanism, morphology, and design, are described for a deeper understanding of Li-S batteries. Different battery parameters, which include safety, cycle life, power, and specific energy, are also described in detail so that by optimizing all the parameters one can ensure that batteries will be available for future applications.

Handbook of Nanomaterials for Wastewater Treatment
Fundamentals and Scale Up Issues
Micro and Nano Technologies
2021, Pages 575-603

Chapter 19 - Nanocomposite membranes for heavy metal removal

Saurabh P. Tembhare [a], Divya P. Barai [a], Bharat A. Bhanvase [a], M.Y. Salunkhe [b]

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Abstract

Water pollution is one of the global challenges, which needs to be addressed urgently. The presence of heavy metals in wastewater possesses a serious threat to the environment and human health. The conventional techniques used for heavy metals removal from wastewater offer some limitations such as fouling, chemical requirement, and also, sludge formation, which require additional costs of disposal. Membrane technology offers advantages over conventional processes, and it overcomes the limitations offered by them. Nanocomposite membranes are a class of membrane processes, which involves incorporation of nanoparticles in the membrane, thus enhancing hydrophilicity, water flux, porosity, mechanical strength, swelling, and fouling resistance. Phase inversion method and interfacial polymerization are the common techniques used for the preparation of nanocomposite membranes. Various nanocomposite membranes used for removal of heavy metals such as chromium, cadmium, arsenic, copper, nickel, and lead are discussed in this chapter. The comparison of nanocomposite membrane processes with conventional processes for heavy metal removal is also reviewed. Although there are reports of excellent performance of nanocomposite membranes at bench-scale level, they possess some challenges for

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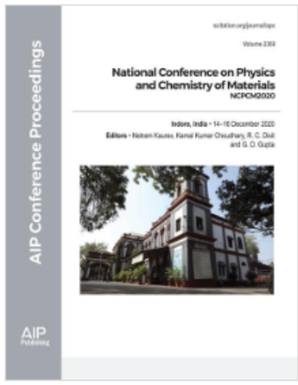

NATIONAL CONFERENCE ON PHYSICS AND CHEMISTRY OF MATERIALS: NCPCM2020
14–16 December 2020
Indore, India

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RESEARCH ARTICLE | SEPTEMBER 13 2021

Effect of digital filtering on the analysis of surface deformations using electronic speckle pattern interferometer

P. P. Padghan; N. B. Bhagat; K. M. Alti

AIP Conference Proceedings 2369, 020030 (2021)
https://doi.org/10.1063/5.0060869

Digital filtering is an essential part of electronic speckle pattern interferometer which is been used widely to study surface deformations. Raw speckle patterns needs digital filtering before it is used for further analysis. Many times multiple use of digital filtering leads to change in the quantitative information of surface under study. This paper reports effect of multiple usages of various digital filters on the calculated surface deformation values. Multiple usages of various digital filtering leads to loss in speckleness of the pattern indicating decrease in speckle noise and marginal and in some cases significant change in surface displacement values.

materialstoday: PROCEEDINGS

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Electronic Speckle Pattern Interference technique for measuring thickness of metallic nano thin films

N.B. Bhagat [a e], P.P. Padghan [b e], R. Kesarwani [c], A. Khare [c], K.M. Alti [d e]

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https://doi.org/10.1016/j.matpr.2021.07.301

Abstract

Electronic Speckle Pattern Interference (ESPI) is a non-contact optical technique generally used for the measurement of surface deformations of various kinds. With the help of phase retrieval algorithms, phase of the deformed object is calculated in this method which can be then converted into displacement information. This paper demonstrates the use of ESPI method to measure the thickness of some nano-sized metallic thin films. Calculated thickness values are in good agreement with the values measured via Profilometer. The least thickness (z-axis) measured by this method is~52±3.1 nm. The z-axis resolution of the used method is at par with other expensive microscopy techniques like atomic force microscopy. Therefore, a low-cost alternative to expensive microscopy techniques is presented in this paper as far as z-axis is concern. Surface roughness of thin films can also be calculated using retrieved surface profiles and they are also found to be in the nanometer range.

Journal of Physics: Conference Series

PAPER • OPEN ACCESS

Ion exchange application of HBAE-I resin

Amit N Gupta[1] and A B Kalambe[2]

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Article PDF

References

+ Article and author information

Abstract

Ion-exchange resin abbreviated as HBAE-I was synthesized. Abbreviation HBAE-I used for p-hydroxybenzaldehyde-adipic acid-ethylene glycolco-polymer inl:1:3 ratio. The IR, ^{1}H NMR spectrum areused for characterization. Ion-exchange properties found for Bi^{3+}, Sb^{3+}, Zn^{2+} and Mg^{2}+ ionsover 4 to 6 pH range. Toxic and heavy metal ions such as Sb^{3+}, Bi^{3+}, Mg^{2+} and Zn^{2+} are present in industrial effluent and wastewaters. The HBAE-I terpolymer resin are a selective for $Bi^{3+}$and Zn^{2+} metals ions at pH 4 and 6 respectively.

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Department of Industrial Policy & Promotion,
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INTELLECTUAL PROPERTY INDIA
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APPLICATION TYPE	ORDINARY APPLICATION
DATE OF FILING	10/08/2021
APPLICANT NAME	**Chitkara Innovation Incubator Foundation**
TITLE OF INVENTION	BENZOFURAN AND PYRAZOLE SUBSTITUTED 1, 3, 4-OXADIAZOLE COMPOUNDS, COMPOSITIONS AND PROCESS OF PREPARATION THEREOF
FIELD OF INVENTION	CHEMICAL
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PRIORITY DATE	
REQUEST FOR EXAMINATION DATE	--
PUBLICATION DATE (U/S 11A)	03/03/2023

Application Status	
APPLICATION STATUS	**Awaiting Request for Examination**

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