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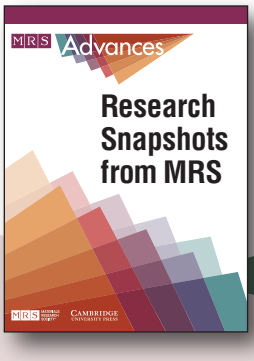


Improved cyclability of nickel-rich layered oxides

Nils P. Wagner, Julian R. Tolchard, Artur Tron, Harald N. Pollen, Heiko Gaertner, Per E. Vullum

The authors report a one-pot method to fabricate two Ni-rich layered lithium oxides. As increased nickel brings with it concerns regarding material stability in battery applications, the impact of small amounts of aluminum impurities on the cyclability of these materials in conventional battery electrolytes is evaluated and conditions that enable capacity retention of up to 85% after 100 cycles in extreme environments are found. doi.org/10.1557/adv.2020.90

Ag, Zn, and Cu nanoparticles synthesized from *Eichhornia crassipes* leaf extracts and their application in phenol photocatalytic degradation

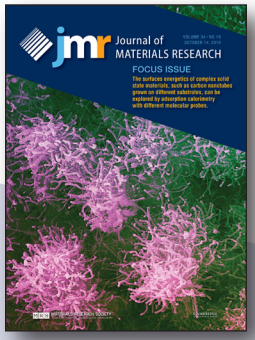
Monserrat Velázquez-Hernández, Pablo Schabes-Retchkiman, Javier Illescas, M.G. Macedo, J.C, González-Juárez, Sonia Martínez-Gallegos

The authors use a natural material extract to precipitate oxide nanoparticles based on these transition metals with particle sizes between 4 and 30 nm, depending on the metallic precursor. The nanoparticle suspensions show the ability to degrade phenols (between 30% and 50% of the compounds) in the presence of UV irradiation in less than 3 hours. doi.org/10.1557/adv.2019.411

Highly sensitive and fast detection of C-reactive protein and troponin biomarkers using liquid-gated single silicon nanowire biosensors

Yurii Kutovyi, Jie Li, Ihor Zadorozhnyi, Hanna Hlukhova, Nazarii Boichuk, Dmytro Yehorov, Marcus Menger, Svetlana Vitusevich

Creating sensors that detect low concentrations of particular proteins is critical in identifying disease and health concerns. The authors use a novel functionalization of silicon nanowires to make them receptive to proteins tied to cardiac health and demonstrate how the adsorption alters semiconducting behavior, enabling electrical detection of the protein concentration. Finally, the roughness of the nanowire increases after detection at a scale that corresponds with protein size. doi.org/10.1557/adv.2020.60



Extending the range of constant strain rate nanoindentation testing

Benoit Merle, Wesley H. Higgins, George M. Pharr

An alternative testing and analysis method, based on quasi-static loading and independent testing of Young's modulus, is shown to extend constant strain rate nanoindentation hardness measurements to high sustained strain rates. The new methodology is demonstrated for constant strain rate nanoindentation hardness measurements up to 100 s^{-1} with an iMicro nanoindenter (KLA, Inc.). Hardware limitations are documented and discussed. doi.org/10.1557/jmr.2019.408

First report on entire sets of experimentally determined interdiffusion coefficients in quaternary and quinary high-entropy alloys

Vivek Verma, Aparna Tripathi, Thiruvenkatam Venkateswaran, Kaustubh N. Kulkarni

Experimental determination of entire sets of interdiffusion coefficients in quaternary and quinary alloy systems is reported. Using the body-diagonal diffusion couple method, interdiffusion coefficients were evaluated in Fe–Ni–Co–Cr and Fe–Ni–Co–Cr–Mn. The strong diffusional interactions seen in Fe–Ni–Co–Cr–Mn alloys establishes that cross interdiffusion coefficients cannot be ignored in high-entropy alloys.
doi.org/10.1557/jmr.2019.378

Inorganic nanorings and nanotori: State of the art

Oxana V. Kharissova, Mauricio Garza Castañón, Boris I. Kharisov

This review summarizes the state of the art of all available inorganic toroidal nanostructures including carbon, noble metals, and oxides. Some show useful properties and possible applications as isolators, sensors, optoelectronics, and as traps for atoms and ions because of interesting multiresonant properties, magneto–optical activity, paramagnetism, and ferromagnetism. It is proposed that research should explore the synthesis and properties of more inorganic systems in this form. doi.org/10.1557/jmr.2019.370

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