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Editorial

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This year marks the tenth anniversary of Google Scholar (started – November, 2004),[1] Scopus (started – November, 2004)[2] and Web of Science (started – 2004).[3] The globalization of research has been made possible rapidly, thanks to the Internet and these three major search engines. In the absence of a personal website, Google Scholar performs an excellent search if not a complete global search. While the debate on what is considered 'scholarly' goes on in the literature,[4–13] it needs to be recognized that Google Scholar has been an asset to researchers, considering that it is absolutely free and requires no paid subscription. The enormous growth of Google Scholar has made it natural for the convergence of at least two of the three major citation search engines. The Web of Science core collections, in collaboration with Google Scholar, will very soon begin to provide new links from January 2015 onwards.[14] This will be a free service provided by Thomson Reuters.[14] At this time, Scopus and Web of Science require paid subscription and thus limit access to users. In the area of biological sciences, PubMed (started – June, 1997) provides free access to MEDLINE.[15] SciFinder (Web version released in 2008) provides access to materials and references in chemistry[16] and requires subscription.

These citation search engines coupled with sites such as Mendeley (founded in November, 2007),[17] Academia.edu (founded in September, 2008),[18] ResearchGate (founded in 2008),[19] Microsoft Academic Search (founded in 2009)[20,21] and CiteSeer (founded in 1997)[22] provide significant access to the actual publication/s. Of these, Academia.edu and Research Gate have grown exponentially in a very short time with over 13 million and three million users, respectively. In order to ascertain if a published paper can be uploaded into the ResearchGate website, it is critical that the authors check publisher copyright policies. The SHERPA/RoMEO website[23] summarizes permissions that are normally given as part of each publisher's copyright transfer agreement.

Materials of interest for energy conversion continue to make significant progress. Examples of these recent advancements include the integration of perovskite solar cells into a flexible fibre[24] and inexpensive approach to water splitting to produce hydrogen.[25]

The first of the papers[26] in this issue of *Emerging Materials Research* presents a study on 'Maxwell-Garnett theory – a method to investigate the quality of SiO_x coatings'. This paper by Stefanie Wald *et al*. of Plasma Technology and Surfaces Group, Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM, Bremen, Germany, presents a study on the influence of coating defects of thin SiO_x coatings on the barrier properties. Coating defects only originate from the coating process; they seem to form independently from the surface roughness of the substrate. The coatings were deposited in a roll-to-roll process (width 1 m) by using the plasma-enhanced chemical vapour deposition technique. The SiO_x coatings, applied in this work, have thicknesses in the range of 30–50 nm with a carbon content of less than 1 at-%. The focus of this research is to investigate the influence of plasma pressure on the coating defects and therefore on the barrier properties. In order to identify nanosized coating defects inside the coating, the Maxwell-Garnett theory was used. The defect volume was indirectly calculated using ellipsometric measurements.

The second paper[27] in this issue focuses on 'Pellistor embedded with aerogel-like silica'. In this paper by Wang *et al.* of the National and Local Joint Engineering Laboratory of Internet Application Technology on Mines, China University of Mining and Technology, Xuzhou, Jiangsu, China, the authors discuss pellistor methane sensors, for which the amount of heat generated by methane combustion reaction is lost to ambient atmosphere through its semi-closed packaging at high working temperature. In order to minimize such heat loss, a new approach is proposed by introducing aerogel-like silica as a packaging material for thermal insulation. The block aerogel-like silica package is prepared by hydrophobic silica aerogel and tetraethoxysilane (TEOS) at ambient drying pressure. The experimental results show that the integrity and properties of the aerogel-like silica are associated with the amount of TEOS and the drying conditions. The most successful sample was obtained with 10 wt% TEOS at 20°C.The specific surface area and the average pore size of the best sample are 412 m^2/g and 14 nm, respectively. With the porous structure and thermal insulation of aerogel-like silica, the performance of the pellistor embedded in aerogel-like silica has been improved due to more combustion heat being reserved around the sensor.

'Synthesis of MgB_2 nanowires and doped orthorhombic boron nanorods' by Rajen B. Patel and Zafar Iqbal of the Interdisciplinary Program in Materials Science and Engineering at New Jersey Institute of Technology and Tsengming Chou of the Laboratory for Multiscale Imaging, Stevens Institute of Technology, is the third paper[28] in this issue of *Emerging Materials Research.* This paper reports a chemical vapour deposition process to create magnesium diboride (MgB_2) nanowires, a well-known superconductor, and orthorhombic boron nanorods. These boron nanorods are doped with magnesium and sulfur, and the doping induces a number of defects in the material. The synthesis technique, which is used to create these materials, is based on a method used originally to create a variety of pure boron nanomaterials. The addition of sulfur

and ammonia dramatically alters the process, resulting in new products. The morphology of these materials was characterized with scanning and transmission electron microscopy. Electron energy loss spectroscopy, electron diffraction and Fourier transform analysis were performed to determine crystal spacing and chemical composition of both materials. MgB_2 nanowires especially, because of their superconducting nature and small dimensions, have a number of interesting uses.

Sonal Agarwal and Nakshatra Bahadur Singh of Sharda University, India, report their studies on 'Zinc ferrite–PVA nanocomposite and removal of chromium from aqueous solution'. This paper[29] describes studies on nanosize zinc ferrite ($ZnFe_2O_4$) prepared by coprecipitation of zinc and iron hydroxides and subsequent calcinations at 500°C. These samples were characterized by X-ray powder diffraction and scanning electron microscopic techniques. Nanosize $ZnFe_2O_4$ (5 wt%) was dispersed in polyvinyl alcohol (PVA) solution and, on evaporation, a film of 1-mm thickness was formed. A PVA film of the same dimension was also made. The film was characterized by Fourier Transform Infrared Spectroscopy (FTIR) and electrical conductivity measurement methods. This film was used to remove Cr^{6+} from dichromate solution, and it was found that the method was quite effective and pH-dependent.

The last paper[30] in this issue of *Emerging Materials Research*, 'Influence of welding and heat treatment on microstructure, properties and fracture behavior of a wrought aluminum alloy', is by Hilty *et al*. of the University of Akron. The welding of aluminium alloy, belonging to the 6XXX series, exerts an adverse influence on its strength. The loss of strength immediately adjacent to the welds can have an influence on the overall behaviour of the structure or component. In this study, the technique of gas metal arc welding was used. The filler material used was a silicon-containing aluminium alloy. Subsequent to welding, the alloy (6061-T4) was subjected to post-weld heat treatment (PWHT) at 185°C for 6 h. Both the as-welded and artificially aged extrusions of aluminum alloy 6061 were examined for both microstructural development and resulting influence on the mechanical properties. Light optical microscopy was used to characterize the microstructure of the starting material. The PWHT had a marginal influence on both the presence and distribution of second-phase particles in the microstructure. The temperature and time of heat treatment should result in the precipitation and presence of very fine precipitate particles in the microstructure. Tensile tests revealed the welded aluminum alloy to have lower strength, both yield strength and ultimate tensile strength, when compared to the as-provided unwelded counterpart. The influence of PWHT on strength, ductility and fracture properties of the alloy, in comparison with the as-provided material, is presented and discussed.

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