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Nanostructured chalcogenide: characterization, analysis and applications for optoelectronics

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High quality CdS nanostructures deposited on n-type Silicon wafers at 200, 400, 500 and 600°C by sol-gel spin coating method without a catalyst are prepared. CdS nanostructures have been characterized by scanning electron microscopy (SEM) and atomic force microscopy (AFM) to research the topography and morphology of the nanostructures. Also, they have been analyzed using X-ray diffraction (XRD); the grin size, full width half maxima, miller indices, strain, dislocation density, lattice constant, interplaner distance and number of crystelinity are measured and bulk modulus is calculated using our model and Fourier transform infrared (FTIR). Photoluminescence (PL) spectroscopy is used to measure the energetic transitions for calculating the refractive index and optical dielectric constant by specific models. Ultra violet (UV-vis) spectroscopy is utilized to study absorption, reflection and extinction coefficient. Thermogravimetric analysis (TGA), differential thermal analysis (DTA) and differential scanning calorimetry (DSC) are to analyze the electrical and thermal properties of antireflection coating material of nanostructured optoelectronics. These electrical properties are studied under different illumination, ambient and dark conditions. The barrier height at applied bias voltage (5 V), was estimated to be 0.73, 0.74, 0.70 and 0.66 eV correspond to 200, 400, 500 and 600°C, respectively. The highest current was found to be 1.0520 mA at 600°C at illumination condition. The measured and calculated results showed a good agreement with other experimental and theoretical data.

Biography

Y. Al-Douri has got his Ph.D. in 2000 in Materials Science and postdoctoral studies from National University of Singapore (Singapore), Technical University of Chemnitz (Germany) and CNRS (France), respectively. He is Editor-in-Chief of International Journal of Nanoelectronics and Materials. He has more than 160 publications till now including papers, books, chapters review, patents, articles and conferences. His research field focuses on modeling & simulation, nanomaterials and nanoelectronics.

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Advance in Mg-based alloys as biodegradable implant materials

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Mg alloys would be very promising materials as biodegradable implants. The biodegradability of the alloys provides a unique advantage of eliminating follow-up surgeries after healing of injuries. Study showed that the degradation products of Mg was a soluble, non-toxic oxides or hydroxides However, commercial Mg alloys such as AZ91, AZ31, AM60B, WE43, etc. which had been studied as possible biomedical materials were essentially developed for structural applications. The issue of toxicity of some of the alloying elements has rarely been addressed.

The purpose of this research was to develop new Mg alloys with Zn and Ca, as well as some rare-earths for orthopedic implant applications. A serial of alloys were designed with different percentages of Zn from 0.5% to 10% with fixed fraction of Ca at 0.3%. In some alloys, amount of Nd and Gd in range of 0.3 to 3.0% was used. They were processed by melting high purity Mg, Zn and Ca elements and rare-earth-Mg master alloys in low-carbon steel crucible in a resistance heating furnace contained in an argon glove box. Casting was performed at 730°C to a heated steel mold. The mechanical properties, such as tensile and compression strengths, corrosion resistance, as well as *in vitro* cell attachment of these alloys were studied. Their microstructures were observed with optical and electron microscopes. Attentions were specifically paid to the correlation among the amount of alloying elements, microstructure, mechanical strength, corrosion resistance.

Biography

Zhigang Xu completed his Ph.D. from North Carolina A&T State University in Materials Engineering track in 2002. He is the lead scientist in magnesium alloy development research team at the NSF Engineering Research Center for Revolutionizing Metallic Biomaterials. His expertise includes metallurgy of magnesium alloys, alloy design, thin film technologies for ceramic energy and/or superhard materials as well as materials characterization techniques.

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