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A study on the characteristics of Ni-Cr-Mn-Y-Dy thin film resistors using high entropy method

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Ni-Cr-Mn-Y-Dy resistive thin films were prepared on glass and Al₂O₃ substrates by DC magnetron co-sputtering from targets of Ni-Cr-Mn-Y casting alloy and Dy metals. Electrical properties and microstructures of Ni-Cr-Mn-Y-Dy films under different proportion of elements and annealing temperatures were investigated. The phase evolution, microstructural and composition of Ni-Cr-Mn-Y-Dy resistive films were characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM) and Auger electron spectroscopy (AES). When the annealing temperature was set to 350°C, the Ni-Cr-Mn-Y-Dy films with an amorphous structure was observed. It is found that the resistivity of Ni-Cr-Mn-Y films was increased with increasing of Dy content. The Ni-Cr-Mn-Y films with 33.2% Dy addition annealed at 300°C which exhibited the resistivity of 1600 $\mu\Omega$ -cm with -8.2 ppm/°C of temperature coefficient of resistance (TCR).

Biography

Ying-Chieh Lee has completed his PhD from Department of Materials and Science and Engineering, National Chung-Hsin University. He is Dean of Office Research and Development, National Ping Tung University of Science and Technology. He has published more than 60 papers in reputed journals.

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