Contribution ID: **1152** Type: **Poster**

A comparative study of Thermoelectric Silicides by Pack Cementation Technique

The evolution of thermoelectric materials, in order to produce electric power from waste heat or refrigeration by applying electrical current power on them, is one of the pioneering topics of the scientific research. Recent experimental researches on new thermoelectric materials, besides the high figure of merit, focus on the low cost, accessibility, low environmental impact mechanical and chemical strength. Some of the most promising materials for this purpose seem to be Thermoelectric Silicides as Magnesium Silicide (Mg2Si), Chromium Silicide(CrSi2) and High Manganese Silicide (MnSi1.7). The current work is a comparative study of structure, morphology, thermoelectric properties and thermal stability of bulk Cr-Si, Mn-Si and Mg-Si coatings deposited on Si. All samples were grown by the method of pack cementation. Concerning the growth process of Cr/Mn-Si and Mg-Si coatings, the Si wafers were packed and sealed in ceramic crucibles with Cr, Mn or Mg powder, a halide activator and then were heat treated at a specific temperature and time respectively. In particular, for Mn and Cr-Si the process was differentiated and carried out in two stages. Initially intermediate phases of Chromium-Silicon and manganese-silicon were created and then by a secondary experimental process, we formed the thermoelectric phases. The morphology and the chemical composition of the samples were determined using Scanning Electron Microscopy (SEM) with an Energy Dispersive Spectroscopy (EDS) analyzer. The structure determination and phase identification were performed by X-Ray Diffraction (XRD) analysis. In addition, thermoelectric properties as Seebeck Coefficient e.t.c. were discussed. Finally, the oxidation resistance of silicides was investigated by Thermogravimetric Analysis (TGA).

This research is co-financed by Greece and the European Union (European Social Fund- ESF) through the Operational Programme «Human Resources Development, Education and Lifelong Learning» in the context of the project “Reinforcement of Postdoctoral Researchers - 2nd Cycle” (MIS-5033021), implemented by the State Scholarships Foundation (IKY).

Speaker Country

Greece

Primary authors: Ms TEKNETZI, Aikaterini (Physics Department, Aristotle University of Thessaloniki); Dr STATHOKOSTOPOULOS, Dimitrios (Aristotle University of Thessaloniki); Dr TARANI, Evangelia (Physics Department, Aristotle University of Thessaloniki)

Co-author: Prof. VOURLIAS, George (Physics Department, Aristotle University of Thessaloniki)

Presenter: Prof. VOURLIAS, George (Physics Department, Aristotle University of Thessaloniki)

Session Classification: C10_Poster Session

Track Classification: C10. Coatings and surface modification technologies