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BOOK OF ABSTRACTS

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Synthesis and Characterization of Magnesium Silicide formed by thermochemical diffusion process

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In last few decades, considerable research effort has been concentrated to develop material which can be used to transform heat into electric power. These materials have been considered as a potential environment-friendly high performance thermoelectric material. Metal silicides are promising thermoelectric materials and characterized by low resistance, high thermoelectric figure of merit ZT , low density, high melting point, thermal stability, low toxicity and fabrication cost. A variety of techniques have been used to prepare silicides, as ball milling, solid state reaction, sputtering, reactive deposition epitaxy. Here, a new environmental friendly, low cost and simple technique, thermochemical diffusion process (pack cementation) was used to synthesize Magnesium silicide (Mg_2Si). Magnesium silicide is a prospective narrow gap semiconductor for thermoelectric energy conversion at high temperatures. The current study focuses on the fabrication of new thermoelectric materials, aiming towards the development of compounds with advanced thermoelectric properties. For this process a powder mixture which contains Si powder Mg (donor material), and a halide salt which is the chemical activator are packed and sealed in a ceramic. The sealed crucible is then heated in an electric furnace under Ar atmosphere. A series of experiments were carried out at temperatures ranging from 450°C to 650°C at different durations from 120 min to 240 min to compose Mg_2Si , thermoelectric powders. The morphology and the chemical composition were determined by SEM equipped with EDS analyzer, the phase identification was performed using XRD analysis, the chemical state was identified via XPS and the oxidation resistance of silicides was investigated by TGA.

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CERTIFICATE OF ATTENDANCE

This is to certify that

Dimitrios Stathokostopoulos

attended virtually the “**RawMat2021 - International Conference on Raw Materials and Circular Economy**” which took place in Athens, Greece 5-9 September 2021 and was organized by the Technical Chamber of Greece, the School of Mining and Metallurgical Engineering of the National Technical University of Athens and the GRawMat Innovation Cluster.

Prof. Anthimos Xenidis
Chair of the Scientific Committee

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