Microwave Synthesis and Characterization of The Series $Co_{1-x}Fe_xSb_3$ High Temperature Thermoelectric Materials

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The use of microwave energy for materials processing has a major potential and real advantages over conventional heating such as a) time and energy savings, b) rapid heating rates (volumetric heating vs. conduction), c) considerably reduced processing time and temperature, d) fine microstructures and hence improved mechanical properties and better product performance and e) finally lower environmental impact. In this study we investigated the use of microwave-assisted synthesis, to synthesize the series of $Co_{1-x}Fe_xSb_3$ using this novel approach, which gave high quality materials with little or no impurity in a fraction of time compared to the conventional synthesis. X-ray diffraction analysis was used to examine the structure and the lattice parameters of the samples while SEM with EDX analysis was used to study the morphology of the compounds. The samples were sintered by SPS and the highest s ZT ~ 0.33 was obtained for x=0.2 at 700 K.

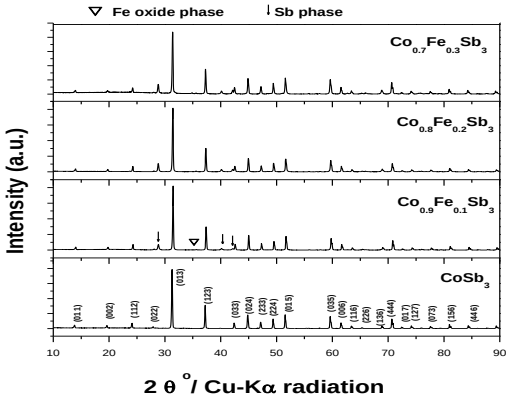

Figure 1: X-ray diffraction analysis of Fe-doped samples after microwave synthesis.