

Design of an Electric Arc Furnace for the Production of Metallurgical Grade Silicon

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Abstract : This project is a step to manufacture solar grade silicon. It consists in designing an electrical arc furnace in order to produce metallurgical silicon Mg-Si with mutually carbon and high purity of silica. It concerns, first, the development of a functional analysis, a mechanical design and thermodynamic study. Our study covers also, the design of the temperature control system and the design of the electric diagrams. The furnace works correctly. A Labview interface was developed to control all parameters and to supervise the operation of furnace. Characterization tests with X-ray technique and Raman spectroscopy allow us to confirm the metallurgical silicon production.

Keywords : arc furnace, electrical design, silicon manufacturing, regulation, x-ray characterization

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