A STUDY ON CRYSTALLIZATION MECHANISM OF AMORPHOUS BORON

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Abstract

Crystalline boron has great added value compared with the amorphous boron due to its high purity. Hence, crystalline boron finds several applications in high-technology. It is very important to determine the crystallization behavior and phase transformations of amorphous boron. However, it is not a well discussed topic. Within the scope of this study, crystalline pure boron is produced by heating the amorphous boron (95-97 % purity, 0.4-0.7µm particle size) in a quartz reactor placed in a tube furnace. Amorphous boron powders, in which the impurities were analyzed by Atomic Absorption Spectrophotometer (AAS), are heated in quartz boats with a rate of 10°C/min under flowing Argon atmosphere in the temperature ranges of 800-1100°C. Then they were cooled rapidly to the room temperature. Phase and morphological characterizations of crystalline boron were conducted by X-Ray Diffractometer (XRD) and Scanning Electron Microscope (SEM). The crystallization and phase transformation of amorphous boron were also proved by Differential Thermal Analysis (DTA).