

عنوان مقاله:

Development the Computational Fluid Dynamics in Nanocrystal Technology

محل انتشار:

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خلاصه مقاله:

Chemical vapor transport (CVT) is known as one of the most efficient methods of synthesizing nanocrystals. In order to investigate the underlying phenomena in CVT processes, especially the growth rate and growth quality in relation to total pressure, temperatures of source and crystal ends, as well as the entangled chemical reactions, CFD modeling is pursued as a powerful and effective tool in lieu of expensive experimental work. CFD modeling has become an important component of the research or a new research methodology and will become increasingly important for simplifying the investigation of phenomena in processes. This paper is presented on how CFD modeling approach can be used as a research methodology in sciences and engineering. Two-dimensional numerical modeling on closed ampoule chemical vapor transport of ZnS-I2 system is conducted. The transport rate (TR) and its transition from diffusion-dominated to convection-dominated regimes in relation to total pressure, average temperature is studied intensively. Modeling results reveal that, the transition of TR from diffusion-dominated to convection-dominated regimes depends on P. Compared to the experimental literature values for all growth regimes, the modeling results agree with the experimental data.

کلمات کلیدی:

research methodology, CFD modeling, Chemical Vapor Transport, Transport Phenomena

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