

Synthesis of Non-Oxide Ceramic Powders via Wet Chemistry for Transparent Ceramic Fabrication

Non-oxide ceramics such as ZnS and ZnSe are highly transparent across a broad spectral range of 0.5–18.0 μm , positioning them as promising candidates for various scientific and technological applications. While chemical vapor deposition (CVD) remains an effective method for producing transparent ZnS and ZnSe ceramics, its high cost and time-intensive nature present notable drawbacks. Additionally, post-synthesis processing via hot isostatic pressing often leads to reduced mechanical strength and hardness due to recrystallization and grain growth. In response to these challenges, researchers have turned to wet-chemical synthesis routes as more economical alternatives for producing ZnS and ZnSe powders suitable for consolidation sintering. In this study, Fe-doped ZnSe powders were prepared using a liquid-phase co-precipitation method. X-ray diffraction (XRD) analysis of the calcined powders confirmed the formation of a single-phase cubic ZnSe structure. Meanwhile, ZnS powder was synthesized via a colloidal processing route, involving the separate dissolution of thioacetamide and zinc nitrate in deionized water, followed by mixing under stirring in a heated water bath. The resulting powders were subsequently heat-treated under flowing argon to eliminate residual organic species. Phase composition was determined by XRD, while morphological and structural features were examined using scanning electron microscopy (SEM) and Brunauer–Emmett–Teller (BET) surface area analysis.

Professional Status of the Speaker

Senior Scientist

Interest in submitting a paper in a special issue of

No interest

Invitation letter for visa

No

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Session Classification: Sintering of specific material systems

Track Classification: Group 4: Sintering of specific material systems