

Grain Growth Kinetics of WC–Ni Cemented Carbides During HIP Sintering

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Cobalt-free cemented carbides have gained significant attention as sustainable alternatives to conventional WC–Co hardmetals, driven by concerns related to cobalt criticality, supply-chain vulnerability, and health hazards. Among the proposed alternatives, WC–Ni systems offer promising potential in fundamental understanding of those alternative systems. However, detailed study on kinetics of grain growth during sintering which critically influences the performance of cemented carbides and selection of other important process parameters remains limited. In this study, the grain growth behavior of WC–Ni cemented carbides during hot isostatic pressing (HIP) are investigated. Samples were sintered at a fixed temperature and pressure using four different holding durations to examine time-dependent microstructural evolution. Microstructural characterization was carried out using optical microscopy, scanning electron microscopy (SEM), and electron backscatter diffraction (EBSD) to assess WC grain morphology, size evolution, and other crystallographic features. Vickers microhardness measurements were performed to provide a preliminary link between microstructural changes and mechanical response. Mechanisms of grain growth are discussed from kinetic analysis.

Professional Status of the Speaker

Doctoral or Master Student

Interest in submitting a paper in a special issue of

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Invitation letter for visa

No

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