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Thixomixing as Novel Method for Fabrication Aluminum Composite with Carbon and Alumina Fibers

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Abstract : This study focuses on a novel method for dispersion and distribution of reinforcement under high intensive shear stress to produce metal composites. The polyacrylonitrile (PAN)-based short carbon fiber (Csf) and Nextel 610 alumina fiber were dispersed under high intensive shearing at mushy zone in semi-solid of A356 by a novel method. The bundles and clusters were embedded by infiltration of slurry into the clusters, thus leading to a uniform microstructure. The fibers were embedded homogenously into the aluminum around 576-580°C with around 46% of solid fraction. Other experiments at 615°C and 568°C which are contained 0% and 90% solid respectively were not successful for dispersion and infiltration of aluminum into bundles of Csf. The alumina fiber has been cracked by high shearing load. The morphologies and crystalline phase were evaluated by SEM and XRD. The adopted thixo-process effectively improved the adherence and distribution of Csf into Al that can be developed to produce various composites by thixomixing.

Keywords : aluminum, carbon fiber, alumina fiber, thixomixing, adhesion
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