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Mechanical Behavior of Alumina Platelets Reinforced in Aluminum Metal Matrix Composites

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ABSTRACT

The tensile properties of an aluminum-based metal matrix composite reinforced with alumina platelets were investigated from an experimental and a theoretical point of view. An increase in Young modulus, 0.2% proof stress, flow stress and ultimate tensile strength was observed over the unreinforced metal. These improvements were obtained at the expense of the tensile ductility. The strengthening mechanisms were analyzed using a model based on punched-out dislocations and a continuum approach. The experimental observations were confirmed by the calculations. The platelets used in this project were characterized by a small ratio thickness to diameter and by a small thickness.

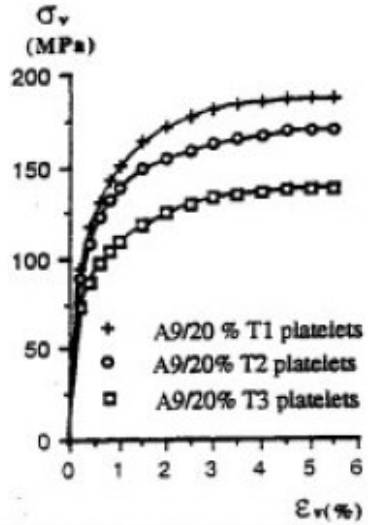

Figure 1: Effect of size of platelets

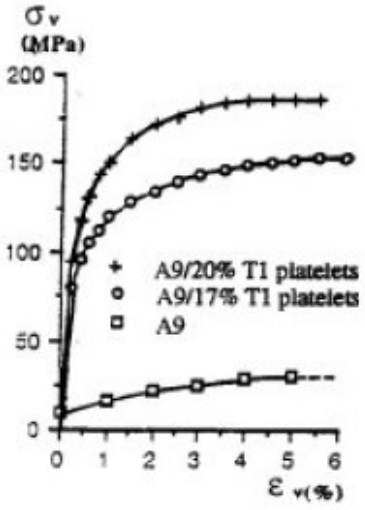

Figure 2: Effect of volume fraction of latelets

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