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# Compression Mechanical Behavior of 7075 Aluminum Matrix Composite Reinforced with Nano-sized SiC Particles in Semisolid State

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The 7075 aluminum matrix composite reinforced with nano-sized SiC particles was fabricated by ultrasonic assisted semisolid stirring method. The compression mechanical behaviour of the fabricated composite in semisolid state was investigated. The results show that the microstructure of the composite before semisolid compression consists of fine and spheroidal solid grains surrounded by liquid phase. Semisolid compression led to a nonuniform plastic deformation of solid grains. A slight plastic deformation occurred in the locations near to free surface due to the dependence of deformation on liquid flow and flow of liquid incorporating solid grains. However, obvious plastic deformation occurred in the central location and location contacting to die due to the contribution of plastic deformation of solid grains. The true stress–strain curve of the sample compressed at 500 °C consists of rapid increase of true stress and steady stage. However, rapid increase of true stress, decrease of true stress and steady stage are involved in the true stress–strain curves of the samples compressed at 550, 560, 570, 580 and 590 °C. The true stress–strain curve at 600 °C is similar to that at 500 °C. Apparent viscosity decreases with an increase of shear rate, indicating a shear thinning occurrence. When soaking time increases from 5 min to 15 min, the peak stress and steady stress decrease significantly. A further increase of the soaking led to a slight change. Peak stress and steady

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