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Effect of warm rolling and annealing on the mechanical properties of aluminum composite reinforced with boron nitride nanotubes

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ABSTRACT

The effect of rolling and annealing on boron nitride nanotube (BNNTs) reinforced aluminum-composites is investigated in this study. Composites were fabricated via conventional sintering method with 0, 2 & 5 wt% BNNT addition in aluminum matrix. Addition of 2 wt% BNNT improved hardness and elastic modulus by 23% and 18%, respectively. Rolling the same composite at 200°C with 60% reduction in single pass improved modulus and hardness of the composite by 60% and 31%, respectively, over Al. Addition of 5 wt% BNNT led to reduced properties due to agglomeration, which on rolling developed cracks. Annealing the rolled Al-BNNT composite further led to an improvement in strength and ductility. Annealed Al-2BNNT showed highest improvement in strength of 41% and 110% over rolled and sintered condition, respectively. In addition, the same composition has recorded 157% improvement in toughness in annealed condition, as compared to rolled condition. Uniformly distributed BNNTs restricted

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