

## **Using high-pressure torsion to make bimetallic composites**

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### **ABSTRACT**

High-pressure torsion (HPT) is a novel technique that can achieve significant grain refinement and strength enhancement in various metals and alloys. In recent years, it was found HPT processing can effectively mix two different metals / alloys from the solid state to produce novel bimetallic composites with excellent mechanical properties. We have successfully processed a Cu-Ta composite using prepacked Cu-Ta-Cu disks in a sandwich-like configuration. After 150 turns HPT processing, the microstructure showed a two-phase feature containing Cu-rich domains and Ta-rich domains. However, each domain consisted of alternating Cu-rich layers and Ta-rich layers. Vorticity and non-monotonic metal flow due to shear deformation introduced by the HPT contributed to the microstructure refinement and layered microstructure formation.

**Keywords:** Cu-Ta composite, high-pressure torsion, nanostructured materials