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Production and Investigation of Ceramic-Metal Composite from Electroless Ni Plated AlN and Al Powders

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Abstract : Al metal matrix composites reinforced with AlN have been fabricated by Tube furnace sintering at various temperatures. A uniform nickel layer on Al(%1AlN)%19Ni, Al(%2AlN)%18Ni, Al(%3AlN)%17Ni, Al(%4AlN)%16Ni, Al(%5AlN)%15Ni powders were deposited prior to sintering using electroless plating technique, allowing closer surface contact than can be achieved using conventional methods such as mechanical alloying. A composite consisting of quaternary additions, a ceramic phase, AlN, within a matrix of Al, AlN, Ni has been prepared at the temperature range between 550°C and 650°C under Ar shroud. X-Ray diffraction, SEM (Scanning Electron Microscope) density, and hardness measurements were employed to characterize the properties of the specimens. Experimental results carried out for 650°C suggest that the best properties as comprehension strength σmax and hardness 681.51(HV) were obtained at 650°C, and the tube furnace sintering of electroless Al plated (%5AlN)%15Ni powders is a promising technique to produce ceramic reinforced Al (%5AlN)%15Ni composites.

Keywords : electroless nickel plating, ceramic-metal composites, powder metallurgy, sintering
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