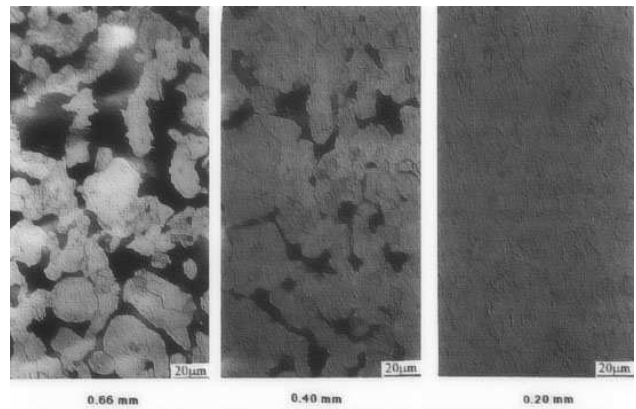


Novel Fabrication Method for Interconnect Materials  
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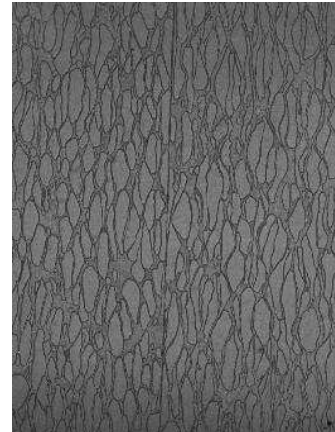
A novel method of fabricating thin sheets of metallic and metallic matrix composite materials is described. A near net shape powder metallurgy process is used to roll compact a blend of powders directly into a thin sheet. A sintered bond is subsequently formed and the initially porous sheet is taken to full density, or intermediate density if desired, by a series of thermo-mechanical steps.

The method is particularly attractive when the material system shows low ductility, as for example with inter-metallic compositions. It is also useful when chemistry control is needed, since different powders can be blended to ensure exact compositions with excellent homogeneity. Segregation effects often seen in melted products are absent. Ceramic powders can be blended with metallic powders to produce metal matrix composite materials in thin sheet form. Low thermal expansion powders can be blended with higher expansion powders to give a controlled expansion product designed to match other materials used in a fabricated structure. In this way materials having unique combinations of corrosion resistance, high temperature properties and electrical properties can be assembled in thin sheet form and in a cost-effective way.

A number of examples are presented, including an iron aluminide intermetallic composition having excellent high temperature oxidation resistance and creep strength. Properties of copper molybdenum and copper tungsten composites having a range of thermal expansion values according to composition are given. A nickel tungsten chromium alloy, difficult to prepare by melt and cast methods, is described.



Fe-Al densification



Mo-Cu composite

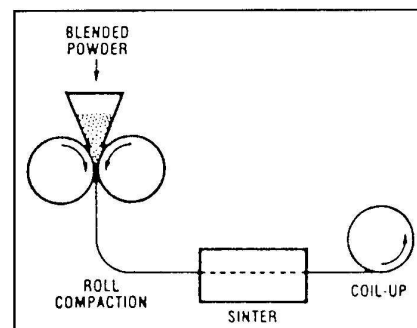


FIG.1 Schematic of the roll compaction process.

Roll compaction