

PROCESS FOR PRODUCING NANOCRYSTALLINE COMPOSITES

ABSTRACT

A process to produce dense nanocrystalline composites such as ceramic bodies, coatings and multi-layered devices with uniform microstructure is disclosed. The invention utilizes sol-gel solutions to reduce agglomeration of nanocrystalline powders in the production of "green bodies" or intermediate products. This novel use of sol-gel solutions also reduces grain growth and porosity in products during sintering. In finished products, final grain sizes are typically less than 100 nm with densities of the final products approaching 99.5% of theoretical densities. In addition, sintering temperatures required are lower than those in conventional methods, typically less than 1,100°C. While FIG. 1 shows one application of this novel process, this invention has wide application in the manufacture of many other products, particularly for composite coatings and in the production of nanodevices.

Figure 1

