

Key Paradigm Shift In Bulk Materials NanoTechnology; Evolution From Surface Technology to Monolithic Sheet

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Bulk Materials NanoTechnology (BMN) is a specific type of materials nanotechnology which involves shrinking the grain/phase sizes down to the nanoscale level (i.e. 1 to 100 nm). The focus of this presentation will be to outline the evolution of BMN from its current state as an advanced surface technology to its pending future as a stand-alone monolithic sheet technology. An emphasis will be placed on linking key mechanisms to their enabling nanoscale structures which result in the development of commercially exploitable properties. Specifically, the manipulation of high hardness / wear resistance and system toughness will be detailed as applied in surface technology approaches in thermal spray and weld overlay coatings. Additionally, structure / property relationships will be emphasized showing how engineered microstructural advances on the nanoscale can enable next generation monolithic plate through the development of high tensile strength coupled with significant levels of global plasticity in tension.