SUPERHARD CBN-AL_2O_3 COMPOSITES FOR CUTTING TOOL APPLICATIONS

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The combinational beneficial properties of high hardness, superior thermal stability and chemical inertness in cubic boron nitride (cBN) have recognised it to the next generation of superhard materials replacing diamond in tools and other similar applications. Unique characteristics of segmented chip formation and elimination of the use of cutting fluids in direct machining of steel parts at a hardened state, known as hard turning has also paced up the use of polycrystalline cBN superhard material in cutting tools. The research studies the production of an alumina based matrix modified with the addition of dispersed superhard cBN grains. Moreover, the study seeks to produce the composites without critical raw materials (CRM: Co, W). The resultant composites are intended to provide improvements in hardness, fracture toughness and wear resistance. The research paves a way to produce low cost and highly efficient ceramic composites with superhard particles using spark plasma sintering (SPS) to create high- performance cutting tools substituting a large scale of tools made of sintered cemented carbides, ceramics and other superhard materials.

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