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Chapter-2

Tungsten Carbide: An Emerging Material for Hard Facing Applications

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Abstract:

Tungsten carbide (WC) is generally very much popular for its outstanding properties which includes its high hardness, high melting point, high Young's modulus, good neutronic properties, high corrosion and oxidation resistance, etc. The tungsten carbide-based composite found more useful in rock cutting and hard facing applications. The tungsten carbide-based composite shows huge industrial potential applications starting from developing small structural and mechanical components to parts of defence equipment. But processing of such tungsten carbide components always have been a challenge for industry because of high melting point and involving complex machining properties. Different furnaces such as arc furnace, graphite, induction, plasma, etc. are generally used for processing of tungsten carbide components and composites. But except plasma technique all other techniques all most take huge time and energy for preparing tungsten carbide components. Maintain its high density in the final processed product is always a challenge. The sintered tungsten carbide components nearly achieve its high density. But melt-cast tungsten carbide components prepared by plasma route is claimed to meet almost all outstanding properties including density, mechanical, physical properties, etc. To reduce its high temperature requirement for processing its components, some of the times metals like Fe, Ni and Co are usually added with tungsten carbide. When tungsten carbide is generally processed it grows with its secondary phase called tungsten semi carbide. The fused tungsten carbide is the composite of tungsten carbide and tungsten semi carbide found to exhibit excellent property in comparison to pure tungsten carbide.

Keywords: Tungsten carbide: Fused tungsten carbide: Composite: Ceramic