The technical trend and the future of super hard material cutting tools

Abstract

Super hard materials which are PCBN (Poly Crystalline Cubic Boron Nitride) and diamond materials are applied to high speed machining and machining of some difficult to cut materials. In This paper, 3 topics about super hard materials are described. First topic, PCBN has used for high speed milling of cast iron so that it has the high hardness and thermal conductivity and also has low reactivity with ferrous materials. But thermal cracks due to thermal gap are one of the difficult issue in high speed milling. Second topic is diamond coated tools for CFRP drilling. Recently CFRP (Carbon Fiber Reinforced Plastic) are applied to aerospace body ,main structure and some parts. Carbon fiber which is contained in CRRP has high hardness, so diamond coated carbide tools are suitable for their machining. The third topic, BL-PCD (Binderless nano Poly Crystalline Diamond) which has higher hardness than single crystalline diamond. BL-PCD tools will realize direct milling of hard cemented carbide for die and mold manufacturing. In this report, these newest super hard material technologies and applications are described.