

Development of an environmentally conscious hard metal FeAl-WC

A hard metal as a new concept with a binder of FeAl intermetallic compound has been successfully fabricated via combustion synthesis reaction. The obtained FeAl-WC has had 1.5 times higher transverse rupture strength than the other studies. And it has revealed 7 times as good oxidation resistance as a commercial hard metal. Moreover, the control of Al content for FeAl-WC has made it possible to prepare both magnetic and nonmagnetic materials.

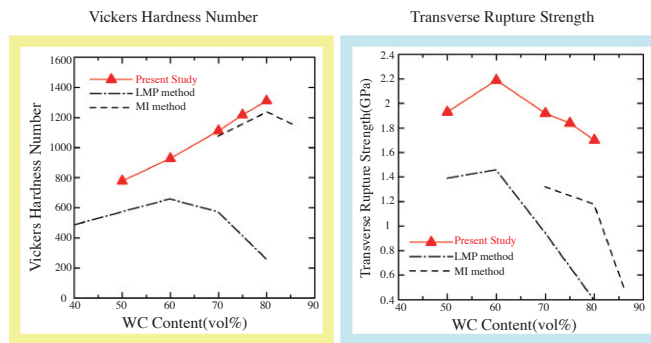


Fig 1: Mechanical properties of FeAl-WC
References:LMP • • • J. H. Schneibel et. al. (1997),MI • • • R.Subramanian et. al. (1997).

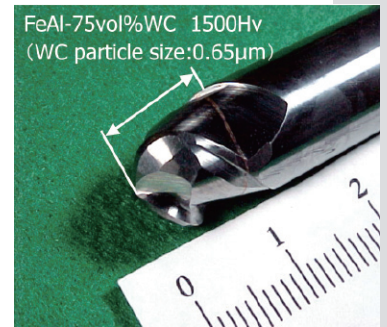


Fig 2: An apparatus of FeAl-75vol% end-mill.

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AIST Today Vol.5, No.6 (2005)
p.26-27

The lowest on-resistance in the normally-off power MOSFET Development of SiC IE-MOSFET

Because of wide band-gap, silicon carbide is an attractive semiconductor material for the advanced low-loss power semiconductor device, and much research has been done to realize it. We recently developed IE-MOSFET (Implantation & Epitaxial MOSFET), in which p-well is composed of heavily implanted bottom layer and lightly doped upper epitaxial layer. The fabricated device exhibits a lowest on-resistance among the normally-off power switching semiconductor devices. This result largely advances the energy saving technology using the power semiconductor devices.

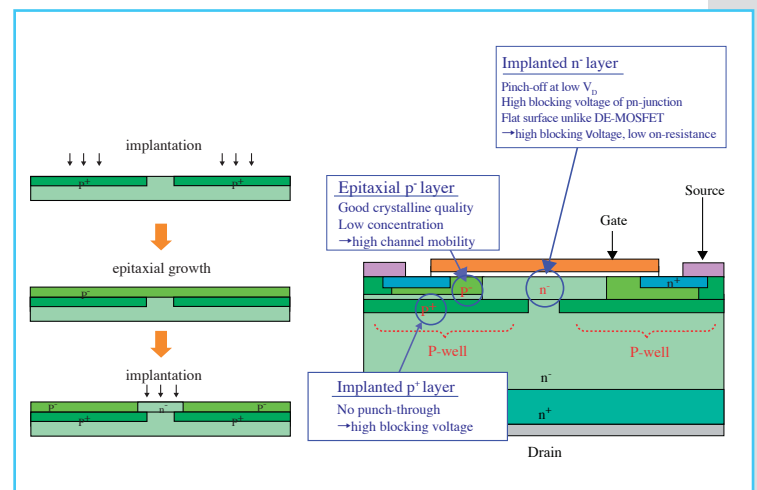


Figure: Schematic cross-section of SiC IE-MOSFET.

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AIST Today Vol.5, No.6 (2005)
p.28-29