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Study of the cutting properties of a composite material based on Al₂O₃ with 15 wt% SiC nanopowders

ABSTRACT. Cutting inserts obtained by electrosintering aluminum oxide and silicon carbide nanopowders have good mechanical properties and high thermal conductivity. Comparative tests of plates made of a composite of Al₂O₃ with 15 wt% SiC (As15-6) were made. The material enables finishing and semi-finishing speeds to be doubled in comparison with plates made of oxide and oxide-carbide cutting ceramics. It has been established that the formation of microcracks at grain boundaries as a result of pore formation and creep in the surface layers leads to chipping of the cutting edge. The high chipping resistance of these As15-6 ceramics is due to their high dispersion and the presence of inordinate mechanical stresses around the SiC grains.

Keywords: aluminum oxide, nanopowder, silicon carbide, sintering, wear resistance

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