was ground by several diamond grinding wheels in order to find out the relation between material removal rate and machining damage. According to the test results, the efficient grinding was performed using a vitrified diamond wheel of 170/200 grain size and the damaged layer was removed using a resinoid diamond grinding wheel of 270/325. [Received August 1, 1985]

pp. 201–3

Electrical Discharge Machining of ZrB_2-Based Composite Ceramics

Kazuo MANNAMI, Kohzo SAKAI and Masataro OKUMIYA

(Research & Development Div., Asahi Glass Co., Ltd.
Hazawa, Kanagawa-ku, Yokohama-shi 221)

ZrB_2 ceramics has high melting point, high hardness, low electrical resistance and high corrosion resistance against molten metal and slag. Because of the low electrical resistance, electrical discharge machining is available for ZrB_2-based composite ceramics. Electrical discharge machining (wire-type and ram-type) for ZrB_2-based composite ceramics has been studied. Cutting rate of ZrB_2-based composite ceramics is 50-70% of conventional steel and 1.5-2 times of cemented carbide. This is the commercial base cutting rate. Machining mechanism is melting and brittle fracture of ZrB_2-based composite ceramics by electrical discharging. Wear of positively polarized electrodes is more remarkable than those of negatively polarized one. ZrB_2 ceramics adhere to the electrode during electrical discharge machining. Because of this adhering, wear of the electrode decreases. [Received August 14, 1985]

pp. 204–13

Electrical Resistivity of SiC-ZrB_2 Electro-Conductive Ceramic Composites

Ken TAKAHASHI, Ryutarou JIMBOU, Yasuo MATSUSHITA and Tetsuo KOSUGI

(Hitachi Research Laboratory, Hitachi, Ltd.
1-1, Saiwai-cho 3-chome, Hitachi-shi 317)

Relations between the composition of SiC-ZrB_2 electro-conductive ceramic composites and their electrical resistivity, as well as their temperature dependences, were investigated. The resistivity of hot-pressed composites was measured by the Pauw method in the temperature range of RT to 800°C. The resistivity of the composites decreases with increasing the volume fraction of ZrB_2, and that was observed to be comparable to the value of Ni-Cr alloys or 18-8 stainless steel above 30 vol% ZrB_2. The effective medium theory can explain the relationship between the resistivity and the composition of the composites with ZrB_2 of more than 40 vol%, indicating the absence of correlation between the geometrical compositions of SiC and ZrB_2 grains in the composite. The resistivity of the composites with ZrB_2 between 23 vol% and 40 vol%, on the other hand, can be interpreted using the percolation theory. The resistivity versus temperature curves indicate the formation of local chains of ZrB_2 particles giving lower resistivities for the composites with ZrB_2 of less than 23 vol% than those expected by the percolation theory. [Received August 9, 1985]

pp. 214–18