

## EDMable SiAlONs

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Electrical discharge machining (EDM) is a non-traditional method of machining that has been widely used to manufacture geometrically complex or very hard materials. Hard machining of SiAlON ceramics require expensive diamond or cBN grinding discs, since their hardness and wear resistance is very high. Therefore, grinding of these ceramics is an important cost. However, electrically conductive materials could be machined with electrical discharge machining (EDM), which is a more cost effective method than conventional machining processes.

In this study, TiN and TiCN particles were incorporated into SiAlON matrix to produce electrically conductive material via gas pressure sintering (GPS) and thus to reduce the machining costs. Effect of TiN reinforcement amount and slurry rheology on the EDMability of the final ceramics and mechanical properties of the selected SiAlON – TiN composites were investigated. It was concluded that the electrical resistivity decreases with increasing TiN amount and minimum 36 vol. % TiN reinforcement is required to be able to EDM SiAlON matrix. On the other hand, because of its hydrophobic nature, increasing the amount of TiN leads TiN particles to migrate to granule surface during spray drying and decrease both the strength and EDMability. Higher solids loading and use of surfactant, on the other hand, prevented the migration.