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MACHINABLE Dy_2O_3 -CONTAINING HAP CERAMICS

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The machinable ceramics are the ceramics that can be drilled by machine. It has reported before. But they are low strength.^{1,2} In our study, Dy_2O_3 -containing HAp ceramics were found to be machinable. The mixed powder of Dy_2O_3 and hydroxyapatite ($\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$, HAp) with molar ratios ((Ca + Dy)/P) from 1.67 (HAp only) to 1.89 were uniaxially dry-pressed at 50 MPa to disks. The test specimens were sintered at 1200–1500°C for 3 h in air. The phases observed mainly by XRD in the sintered body were HAp and Dy_2O_3 . The relative density of the test specimens were almost above 95%. Three-point bending strength were 50~90 Mpa, and fracture toughness were 0.8~1.7 $\text{MPa}\cdot\text{m}^{0.5}$ of the test specimens sintered at 1250°C. The test specimens presented machinability in the range of molar ratios 1.78–1.89.

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