

Laser Sintering of alumina

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A direct laser sintering process that uses a high-intensity continuous wave (CW) laser as the heat source has been developed and 1 mm thick alumina was successfully sintered by laser irradiation for 1 minute. In this process, a YAG laser (or a fiber laser with a similar wavelength) with weak absorption was used instead of a conventional CO₂ laser, which is strongly absorbed by alumina. We found that preheating the alumina improved absorption. Laser sintering of high-purity alumina produced porous bodies with 60% porosity and a bending strength of 200 MPa due to selective powder surface heating. Sintered bodies composed of large crystals (1 mm in size) can be obtained from a mixture of coarse and fine alumina particles by selectively melting the fine particles under laser irradiation. Furthermore, we developed a novel laser sintering aid that preheats the alumina body under laser irradiation, functioning like conventional sintering aids. This aid was confirmed to enable high-density sintering in a short amount of time by promoting liquid-phase sintering under laser irradiation.

Professional Status of the Speaker

Senior Scientist

Interest in submitting a paper in a special issue of

No interest

Invitation letter for visa

No

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