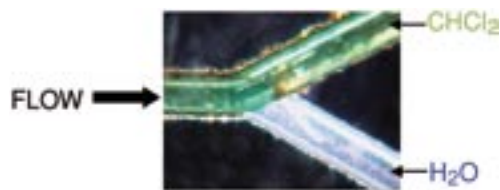


Efficient Enzyme Reaction in Microchannel Reactor

Microchannel reactors have been attracting attention as a novel reaction apparatus in chemical industry. We have developed enzyme-immobilized microreactor, which can perform multistep enzyme reactions. We also developed partial surface modification method of microchannel surface for separation of aqueous and organic solution within microchannel. Using this method, we have developed efficient enzyme microreactor for optical resolution of chiral compounds. Further development of micro-bioreactor are in progress.



Separation of aqueous and organic solution in surface-modified microreactor

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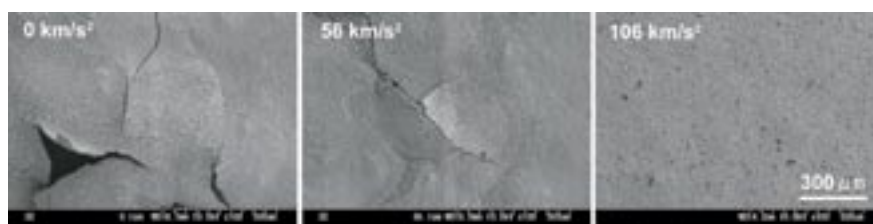
Crack-Free Thick Film via Centrifugal Sintering

Centrifugal sintering is an advanced technology that is specifically designed to sinter structures under constrained conditions, such as films on substrates and layered ceramics. This technology consists of loading high centrifugal acceleration more than 100 km/s^2 onto specimens and heating. Owing to the distinctive pressing measure, pressing without molds and anisotropic shrinkage during sintering are

achieved. This process has been found to be a successful strategy for eliminating shrinkage mismatches in multi-layered ceramics, leading to a crack-free homogeneous microstructure. This distinctive feature of centrifugal sintering arises from anisotropic shrinkage that is caused by chief densification progress along the radius of rotation.

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Suppression of cracks in thick film by centrifugal sintering. The number indicates centrifugal acceleration