

Catalyst Coatings on Microstructured Plates for Catalytic Micro Heat Exchangers

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For chemical reactions in microstructured reactors, it is necessary to provide oxide coatings as carriers for metal catalysts to increase the overall inner surface area of the microchannels. Several techniques have been utilized for coating microchannels with porous oxides: anodic oxidation which has been used to provide a porous layer on aluminum; chemical vapor deposition; deposition of nanoparticles; and sol-gel process. In these coating process, anodization leads to formation of unbranched, regular and nearly concentric pores, which is advantageous for catalytic reactions. Moreover, the strength of adhesion of the anodic oxide layer to the support is strong. This study dealt with vacuum brazing method for assembly of microchanneled stainless steel and aluminum plates. It was also attempted to braze microchanneled stainless steel plates coated with alumina and to coat microchannels in assembly of stainless steel plates with alumina. Microchanneled aluminium plates were anodized at various conditions to find out an optimal condition of anodization.