

142y Zeolite Y Coatings on Al-2024-T3 Substrate by a Novel Three-Step Synthesis Method

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Many attempts to combine low silica zeolites with Aluminum substrates have met with failure. This is unfortunate because by combining the low weight and high thermal conductivity of aluminum with the ability of LSZ to remove contaminants and produce oxygen enriched air, desirable alternatives are offered for weight and size conscious environments. The solution, a Zeolite Y film on Aluminum 2024-T3 was formed by a novel three-step synthesis method. In the first step, the bottom layer is formed by synthesizing the high silica ZSM-5 film on the Al 2024-T3 substrate. In the second step, the ZSM-5 film is seeded with Zeolite Y followed by a short ZSM-5 synthesis to form the bridging layer. Finally, the low silica Zeolite Y film is synthesized on the bridging layer by seeded growth to form the top layer. All three layers were characterized by SEM, EDAX, and XRD. The ZSM-5 film offered excellent corrosion and oxidation protection for the aluminum under the high pH conditions required for low silica Zeolite Y synthesis. The bridging layer was critical in providing adhesion between the bottom and top layers. All three layers were found to be uniform and continuous, with the Si/Al ratio decreasing in the layers from bottom to top.