
Study of morphology and stability of Al₂O₃ washcoat prepared by plasma spraying technique

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Abstract

According to the World Health Organization (WHO) database of outdoor air pollution in 565 cities represented by the annual mean concentration of fine particulate matters PM_{2.5}, i.e. particles smaller than 2.5 microns, the HK urban area ranked in the bottom eight. The pollutants mainly come from diesel heavy vehicles such as trucks and buses (source: Hong Kong Economic Times date: November 21, 2011). A good catalyst converter and associated coating technology suitable for automobile catalytic converters will effectively reduce the amount of released pollutants from these vehicles. This work provides physical/plasma vapor infiltration method for the deposition of Al₂O₃ washcoat for catalytic converters. A dc plasma spraying technique is applied to deposit Al₂O₃ washcoat on ceramic substrate of different geometry (foam, honeycomb) for subsequent synthesis of catalysts. The crystal structure and morphology of the deposited Al₂O₃ washcoat with different distance away from the spray gun will be examined by means of X-ray diffraction (XRD) and scanning electron microscopic (SEM) techniques. The application of plasma spray technique for deposition of washcoat for catalytic converters used in automobile exhaust purification will be discussed.

Keywords: Plasma spraying, Washcoating

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