

COMPOSITE MATERIAL, ITS MANUFACTURING, GENERATION AND USE
IN METHANE CRACKING

ABSTRACT

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Here disclosed is a composite catalyst for methane cracking and a method of producing the composite catalyst. The composite catalyst includes a substrate formed of metal oxide, and one or more catalytic transition metals solubilized in the metal oxide, wherein the metal oxide includes a metal which differs from the one or more catalytic transition metals, wherein the metal oxide forms a matrix which the one or more catalytic transition metals are solubilized in to render transition metal ions from the one or more catalytic transition metals, wherein the transition metal ions under a reducing atmosphere diffuse to reside as transition metal nanoparticles at a surface of the substrate and the transition metal nanoparticles under an oxidizing atmosphere diffuse away from the surface to reside as transition metal ions in the metal oxide, and wherein the transition metal nanoparticles at the surface induce carbon from the methane cracking to deposit on the transition metal nanoparticles and have the carbon deposited grow away from the substrate.

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FIG. 2B to be published with abstract