

Coprecipitated nickel-alumina catalysts for methanation at high temperature.

Part 2. - Variation of total and metallic areas as a function of sample composition and method of pretreatment

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Results are presented for the total and metallic nickel areas of a series of coprecipitated nickel-alumina catalysts prepared and pretreated in different ways. The total areas of the samples decrease on reduction and with increasing reduction temperature, while the nickel area increases with reduction temperature. Increasing calcination temperature causes a decrease in total and nickel areas, this being particularly marked at high temperatures of calcination. A model for the catalyst system is proposed, based on these results and on complementary structural investigations. The high stability of the catalysts is attributed to the presence in the unreduced catalyst of nickel oxide rich phases containing dissolved aluminium ions; on reduction, alumina crystallises on the surface of the growing nickel crystallites, preventing sintering of the catalysts except under extreme conditions.