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## **Cobalt electrodeposition in nanoporous anodic aluminium oxide for application as catalyst for methane combustion**

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### **Abstract:**

The present work is focused on the cobalt electrodeposition in anodic aluminium oxide and the application of the obtained nanocomposite layer as a monolithic catalyst for complete methane oxidation. For the investigation of cobalt nanowires growing in the pores of nanoporous alumina template, cyclic voltametry and galvanostatic method were used. Scanning electron microscopy (SEM) and energy dispersive spectroscopy (EDS) were applied in order to determine the morphology and the content of the composite material in some stages of its preparation. It was found that the deposition of cobalt from a neutral borate electrolyte is accompanied by release of a small amount of hydrogen, which decreases with the process of nanowires growing.

The emergence of the individual flake cobalt clusters on the alumina template is considered as the most suitable structure of the monolithic catalysts. The final resulting laminar composite structure with outer layer of Co- and Pd-oxides exhibits higher active catalytic

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