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**Co metal nanoparticles deposition inside or outside multi-walled carbon
nanotubes via facile support pretreatment**

Mariya A. Kazakova*^{a,b}, Andrey S. Andreev^{b,c}, Alexander G. Selyutin^a, Arcady V. Ishchenko^{a,b}, Alexander V. Shuvaev^d, Vladimir L. Kuznetsov^{a,b}, Olga B. Lapina^{a,b}, Jean-Baptiste
d'Espinose de Lacaillerie^c

^a Novosibirsk State University, Pirogova 2, Novosibirsk, 630090, Russia

^b Boreskov Institute of Catalysis, SB RAS, Lavrentieva 5, Novosibirsk 630090, Russia

^c Soft Matter Science and Engineering (SIMM), UMR CNRS 7615, PSL Research University,
ESPCI Paris, 75005, Paris, France

^d Siberian Transport University, D. Kovalchuk 191, Novosibirsk, 630049, Russia

Abstract

Decoration of one-dimensional multi-walled carbon nanotubes (MWCNTs) with zero-dimensional Co nanoparticles leads to hybrid structures with chemical and electromagnetic features that are not available to the individual components. This work addresses the influence of the nature and structure of MWCNTs on the localization of Co nanoparticles. Depending on synthesis conditions, Co can be deposited on the external or in inner surfaces of the nanotubes. Co/MWCNTs hybrids have been characterized by *in situ* X-ray powder diffraction, high-resolution transmission electron microscopy and ⁵⁹Co internal field nuclear magnetic resonance. It has been shown that the average diameter (7.2, 9.4 and 18.6 nm), number of walls (5-7, 12-15, 15-20), and functional composition of the MWCNTs have a remarkable effect on the size of Co nanoparticles and their distribution in the structure of MWCNTs. The observed phenomenon has

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