Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Superparamagnetic behaviour of metallic Co nanoparticles according to variable temperature magnetic resonance

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Supplementary materials

T_2 measurement in IF NMR.

To account for all possible sources of intensity change due to the temperature variation we have also measured the T_2 relaxation constant for fcc-Co line at both temperatures (line located at ~216 MHz at 300 K and ~221 MHz at 30 K), as it was the most prominent line in both spectra. The T_2 constant measurement was done in a usual way by plotting the intensity of the spectrum against the varied echo delay and fitting this plot with a single mode exponential decay function. The measured T_2 constants were 15.5 μs and 23.3 μs at 300 K and 30 K correspondingly (Fig. S1). Such values make the T_2 relaxation term $e^{-2\tau/T_2}$ significant with the echo delay τ of 6 μs.

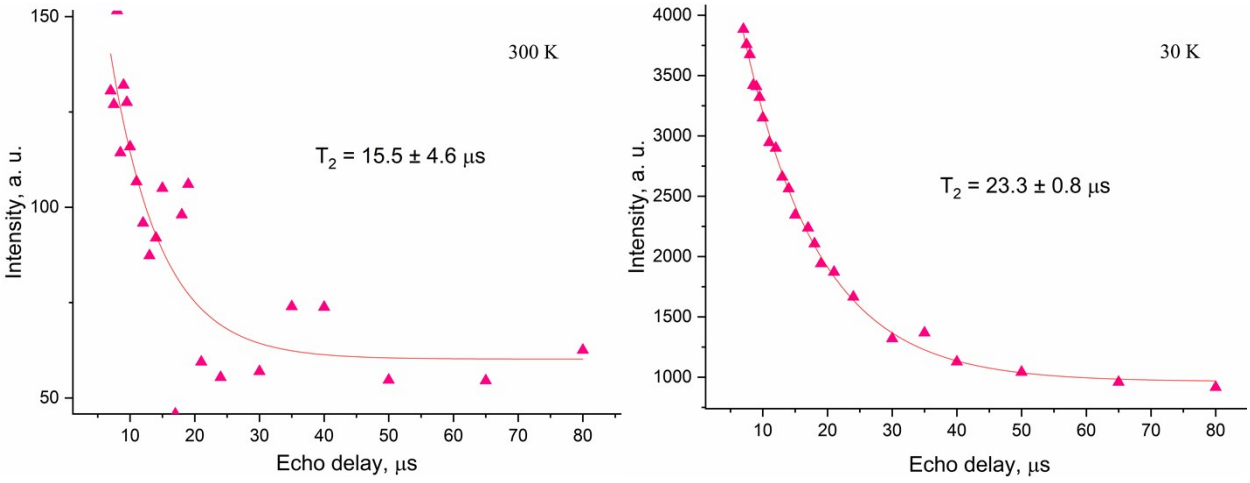

Figure S1. T_2 relaxation constant measurement results for 300 K (left) and 30 K (right) experiments. Experimental points are shown with symbols; the exponential decay approximation results are shown with solid red lines.

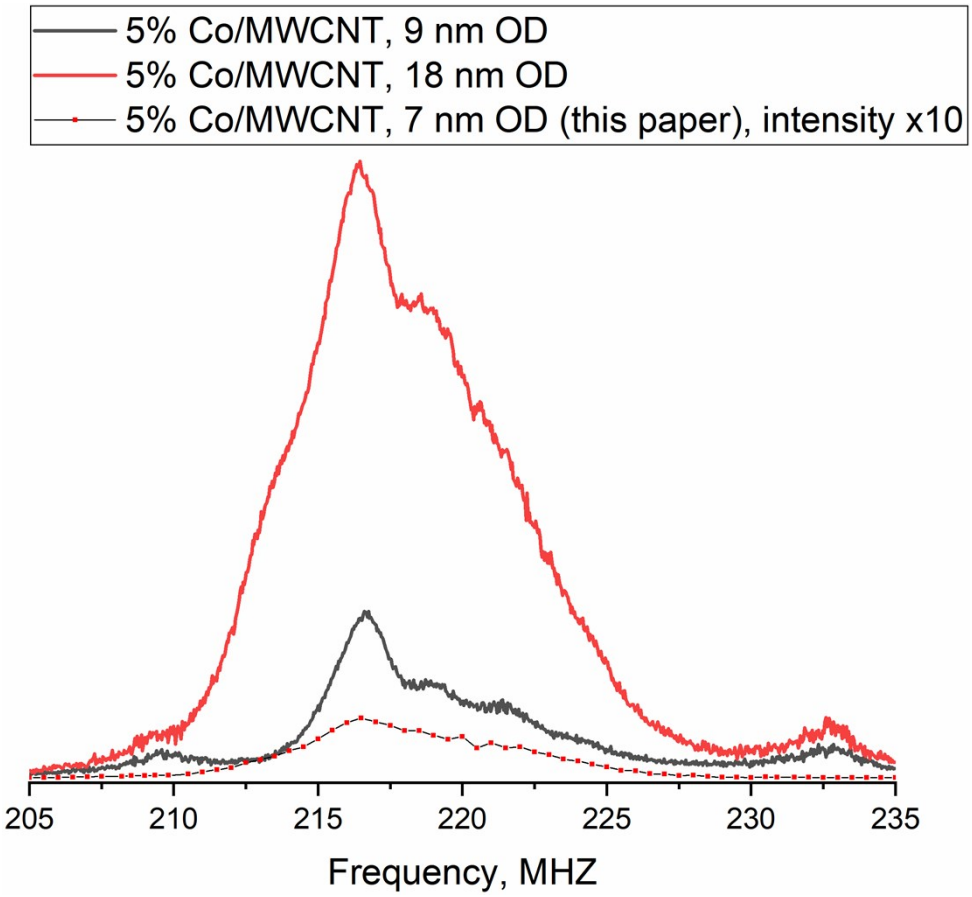

Figure S2. Comparison between room-temperature ^{59}Co IF NMR spectra of Co/MWCNT composites with similar Co weight content supported on nanotubes with different morphology (outer diameter of nanotubes is shown in the legend)

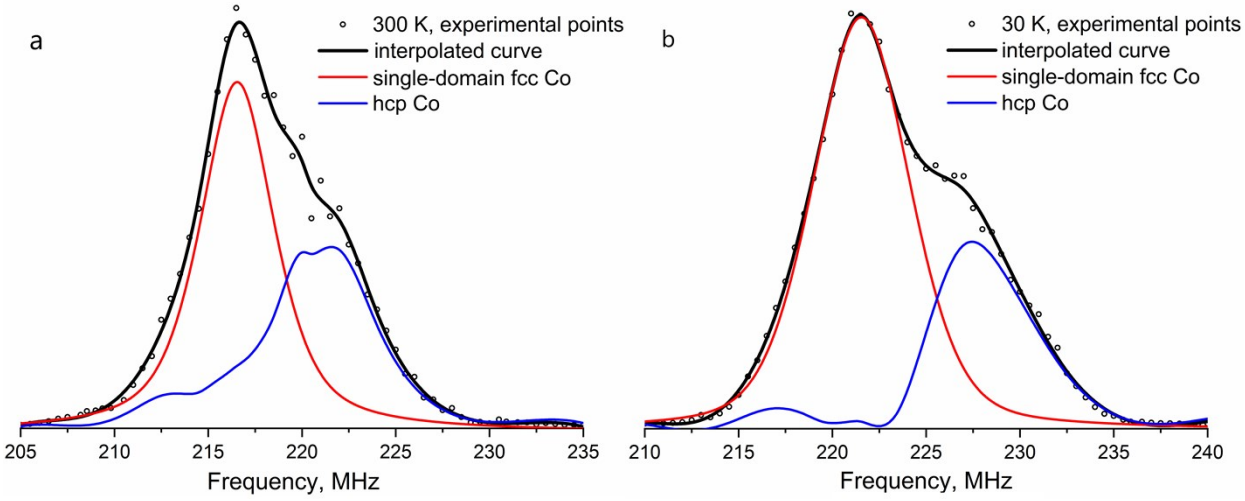

Figure S3. Possible decompositions of the experimental ^{59}Co IF NMR spectra (circles – experimental points, black line – cubic spline interpolation of the experimental points) at 300 K (a) and 30 K (b). A pseudo-Voigt profile corresponding to single-domain fcc Co is shown with red line; the blue line corresponding to hcp Co is obtained by subtracting the single-domain fcc line from the experimental spectrum.

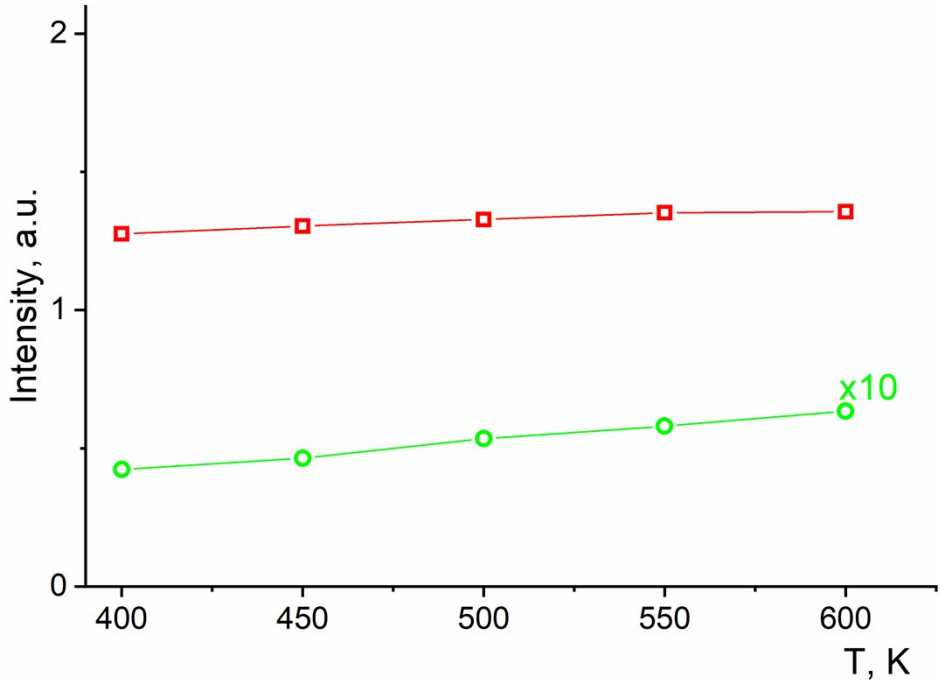

Figure S4. Intensities of the broad (red squares) and narrow (x10) (green squares) components of the FMR high-field signal depending from temperature.