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

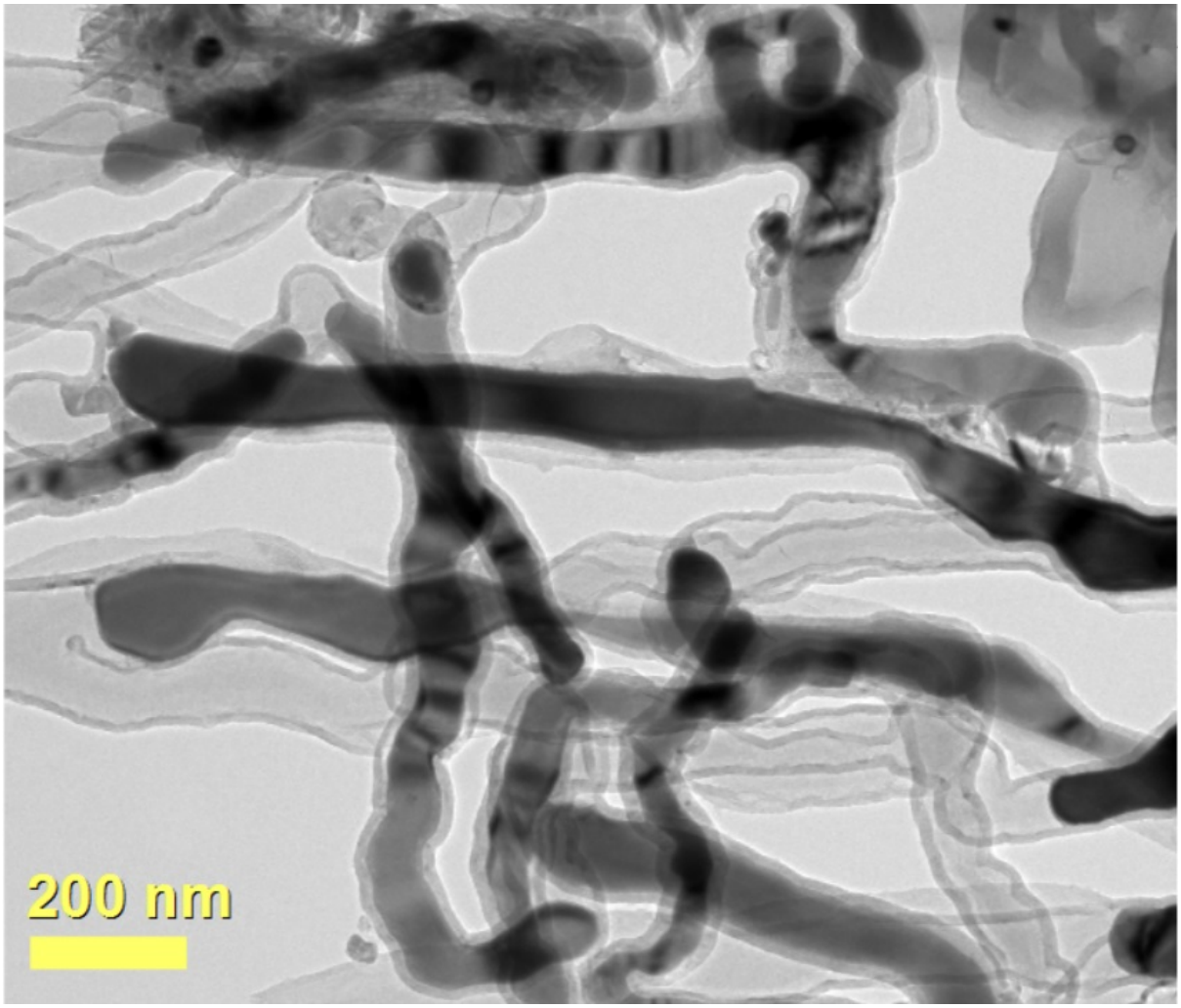

Figure S1: Transmission electron micrograph showing the filling rate and the diameter of the CNTs filled with FeNi crystals.

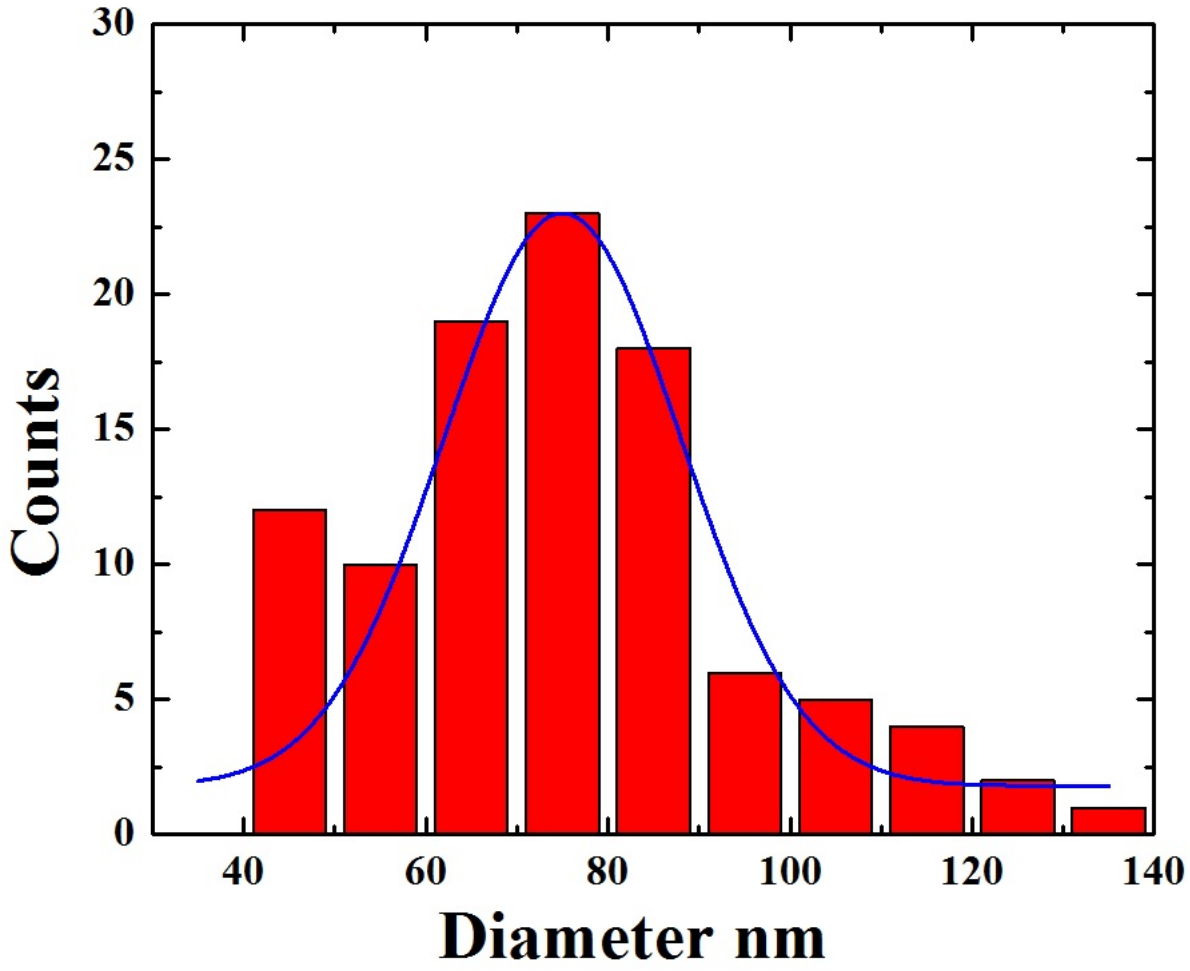

Figure S2: Size distribution of the CNTs shown in Fig.S1 confirm a crystal diameter range of 70-100 nm

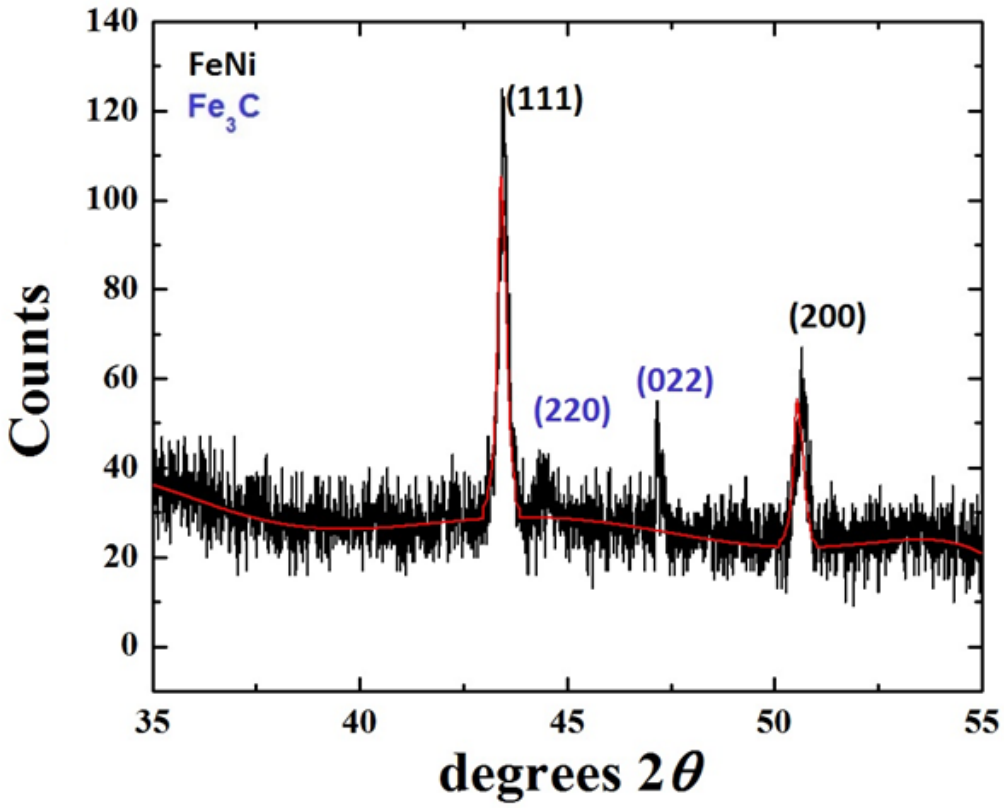

Figure S3: XRD diffractogram and Rietveld refinement of the buckypaper comprising CNTs highly filled with gamma-FeNi (Fm-3m). The estimated grain size is 30.5 nm.

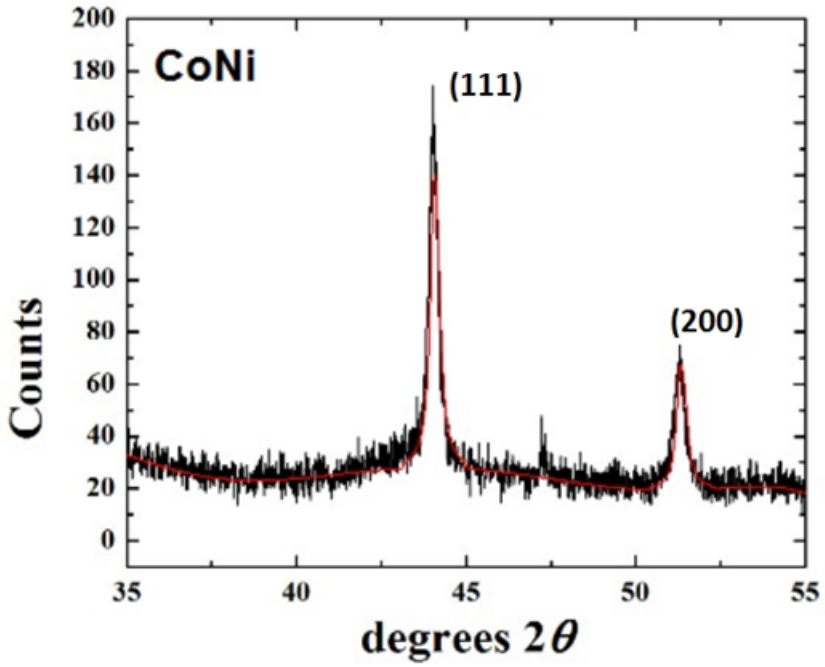

Figure S4: XRD diffractogram and Rietveld refinement of the buckypaper comprising CNTs partially filled with CoNi (Fm-3m). The estimated grain size is 25.6 nm.

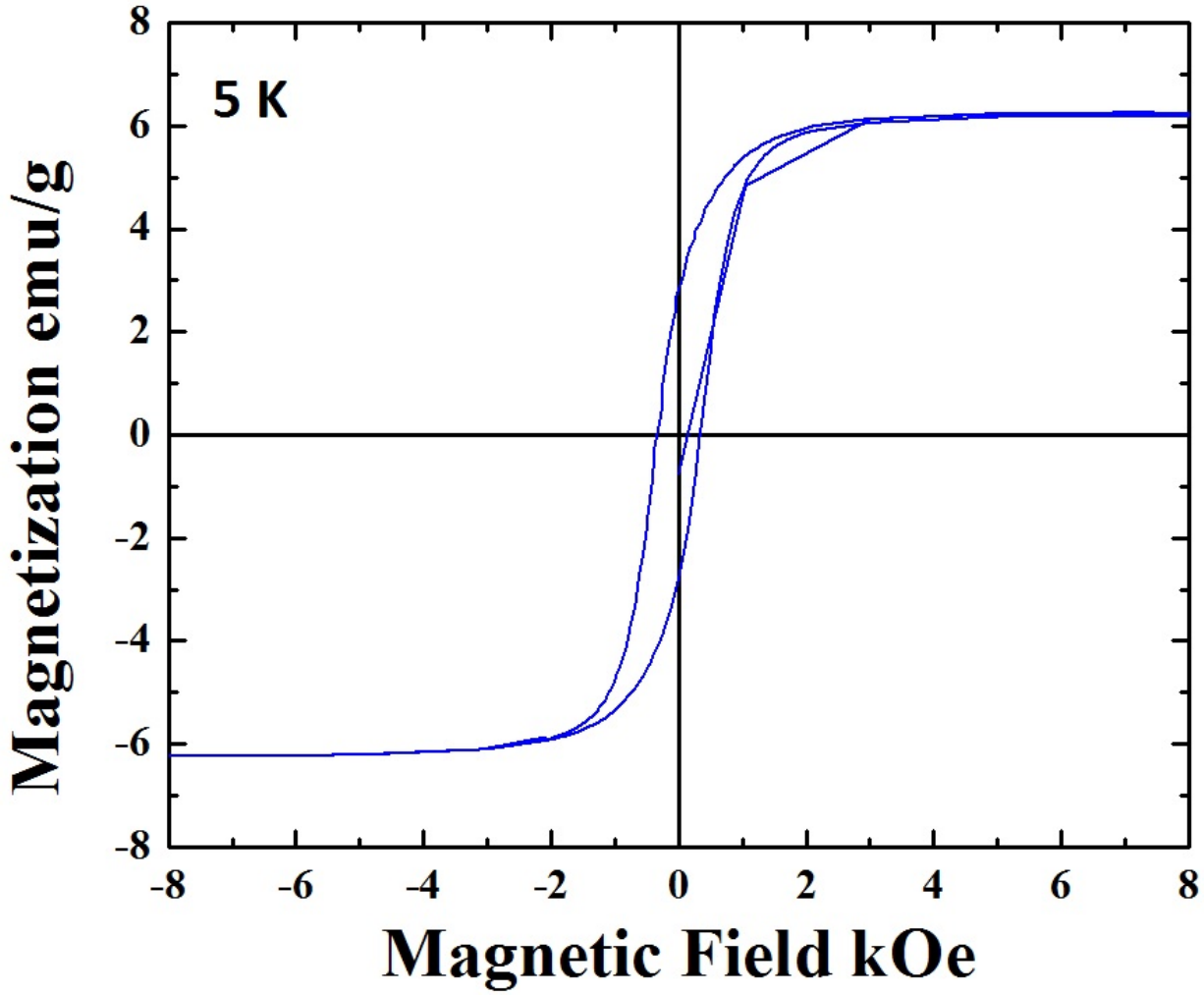

Figure S5: Hysteresis loop of the buckypaper (in a powdered form for squid analyses) comprising CNTs partially filled with Ni measured at 5K.

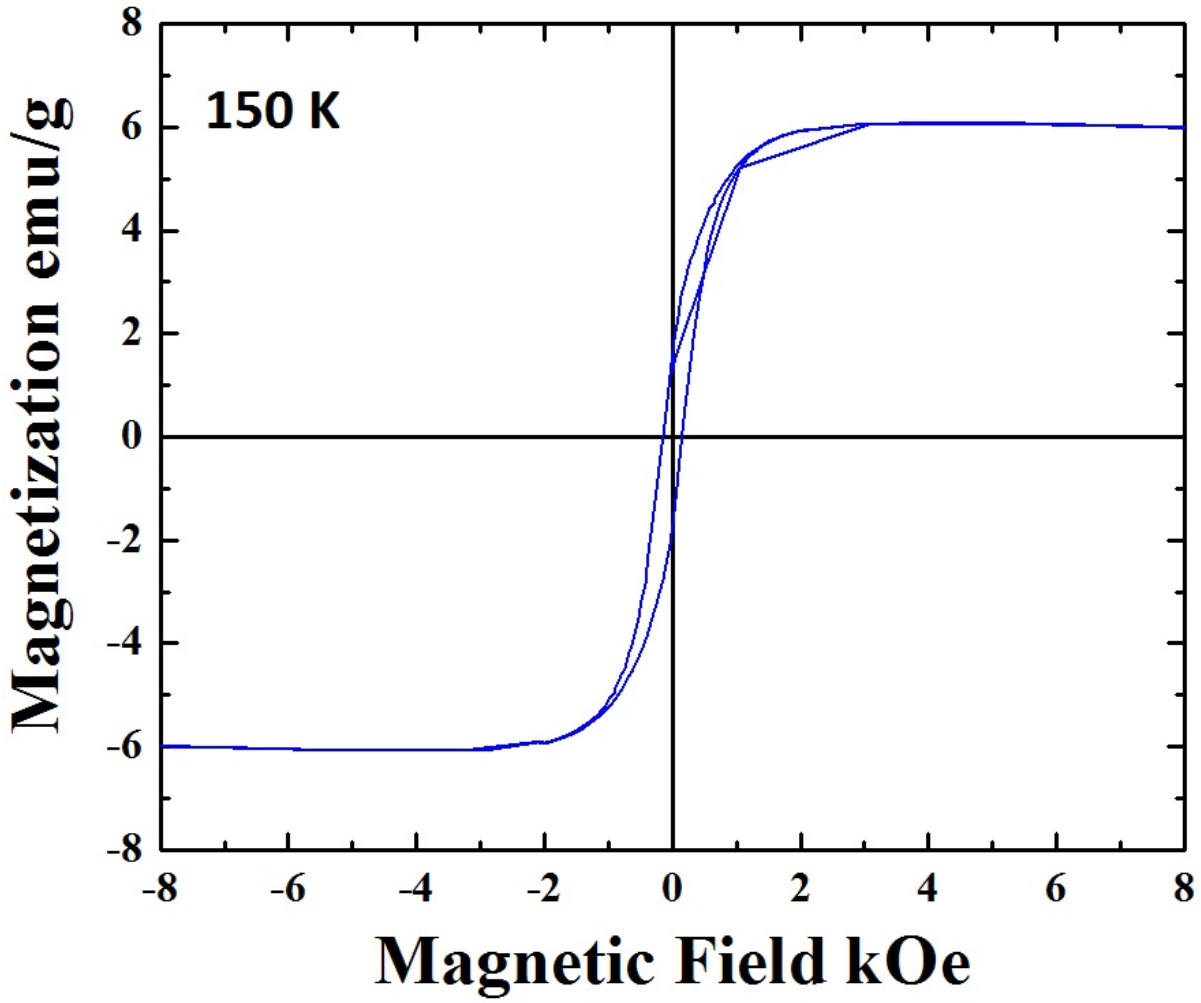

Figure S6: Hysteresis loop of the buckypaper (in a powdered form for squid analyses) comprising CNTs partially filled with Ni measured at 150K.

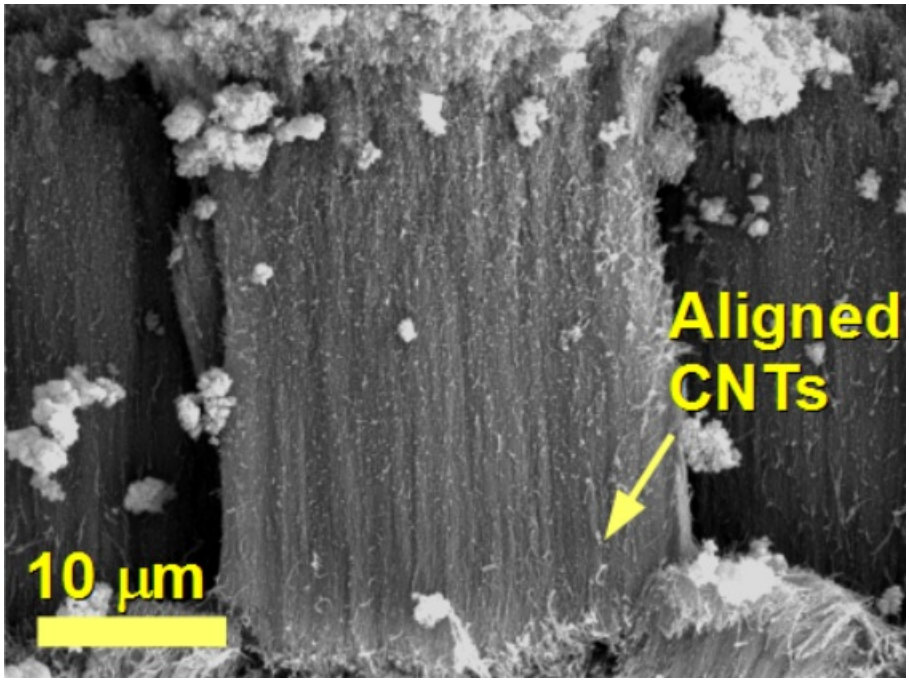

Figure S7: Typical example of a film of aligned CNTs partially filled with FeCo. Similar results can be obtained also for FeNi phases.

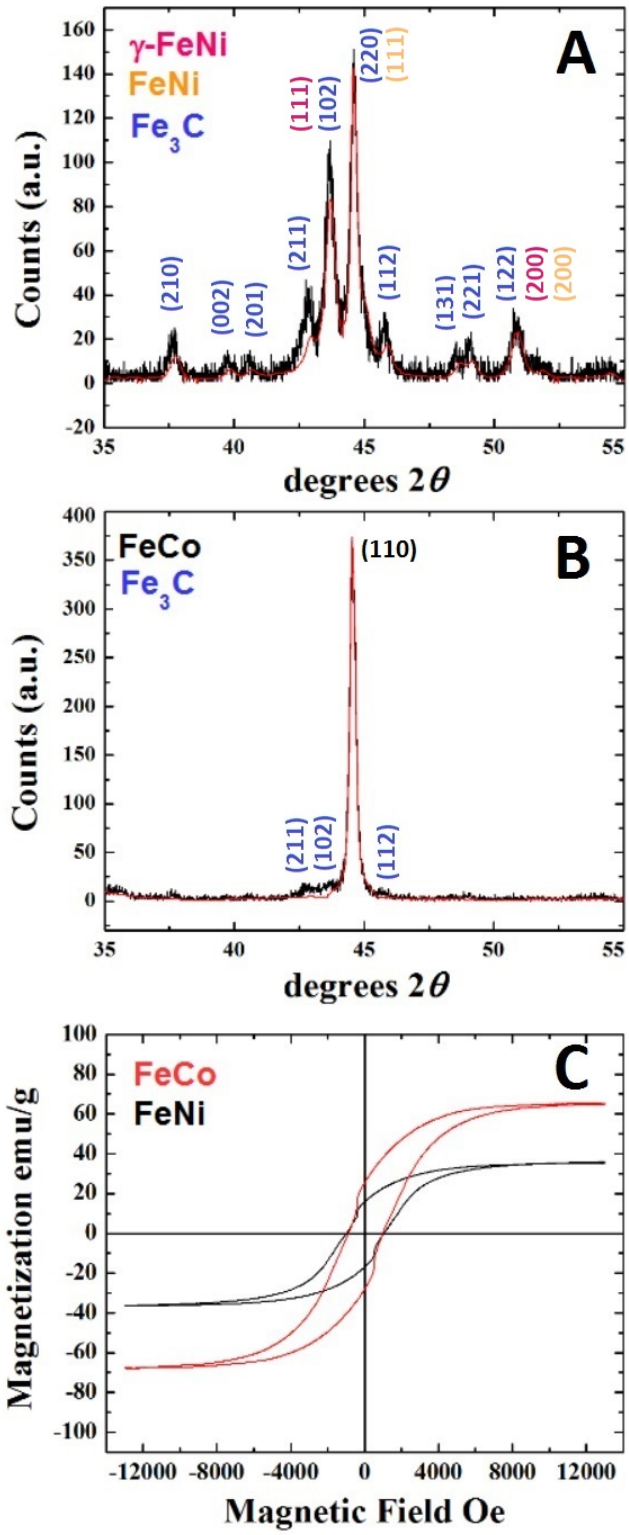

Figure S8: XRD diffractograms A-B and VSM measurement C of the samples comprising aligned CNTs partially filled with FeCo and FeNi.