Supporting Information

Magnetoelectric behavior of 0-3 Co/BaTiO$_3$-Composites

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**Figure S1:** XRD patterns of all Co$_x$(BaTiO$_3$)$_{1-x}$ composites after reduction in forming gas at 1073 K for 2 h (a) and after sintering in nitrogen at 1623 K for 2 h with carbon as oxygen getter (b).

**Figure S2:** Calculated standard Gibbs free energies of oxide formation for cobalt and carbon (full lines), based on data from Barin et al.$^{48}$ and the corresponding equilibrium oxygen pressures (dashed lines).
Figure S3: XRD patterns of Co$_{0.6}$/BaTiO$_3$$_{0.4}$ after reducing in forming gas at 1073 K for 2 h, sintering in nitrogen at 1623 K for 2 h with carbon as oxygen getter and after a further reductive sintering in forming gas at 1073 K for 2 or 12 h.

Figure S4: REM and EDX area scan of Co$_{0.8}$/BaTiO$_3$$_{0.2}$. 


Figure S5: Temperature dependence of the relative permittivity of Co_{x}/(BaTiO_3)_{1-x} with x = 0.1 to 0.6 measured at 1 kHz.

Figure S6: Field dependence of the magnetoelectric coefficients of the Co_{x}/(BaTiO_3)_{1-x} samples (x = 0.1 to 0.6) for parallel (a) and perpendicular orientation (b).
Figure S7: Influence of the frequency of the magnetic AC-field on $\alpha_{ME}$ for Co$_x$(BaTiO$_3$)$_{1-x}$ samples with $x = 0.1$ (a), 0.2 (b), 0.3 (c), 0.4 (d), 0.5 (e) and 0.6 (f) in parallel (black filled squares) and perpendicular orientation (blue open squares).
Figure S8: Temperature dependence of the magnetoelectric coefficient of the Co$_{0.5}$(BaTiO$_3$)$_{0.5}$ composite in comparison with the dielectric constant of BaTiO$_3$ (according von Hippel[34]).

Figure S9: Comparison of M vs. H for an P||H and P⊥H electrically poled Co$_{0.2}$(BaTiO$_3$)$_{0.8}$ composite (a) and the difference between the observed magnetizations as a function of the magnetic field (b).