

# Diffusion Doping of Cobalt in Rod-shape Anatase TiO<sub>2</sub> Nanocrystals Leads to Antiferromagnetism

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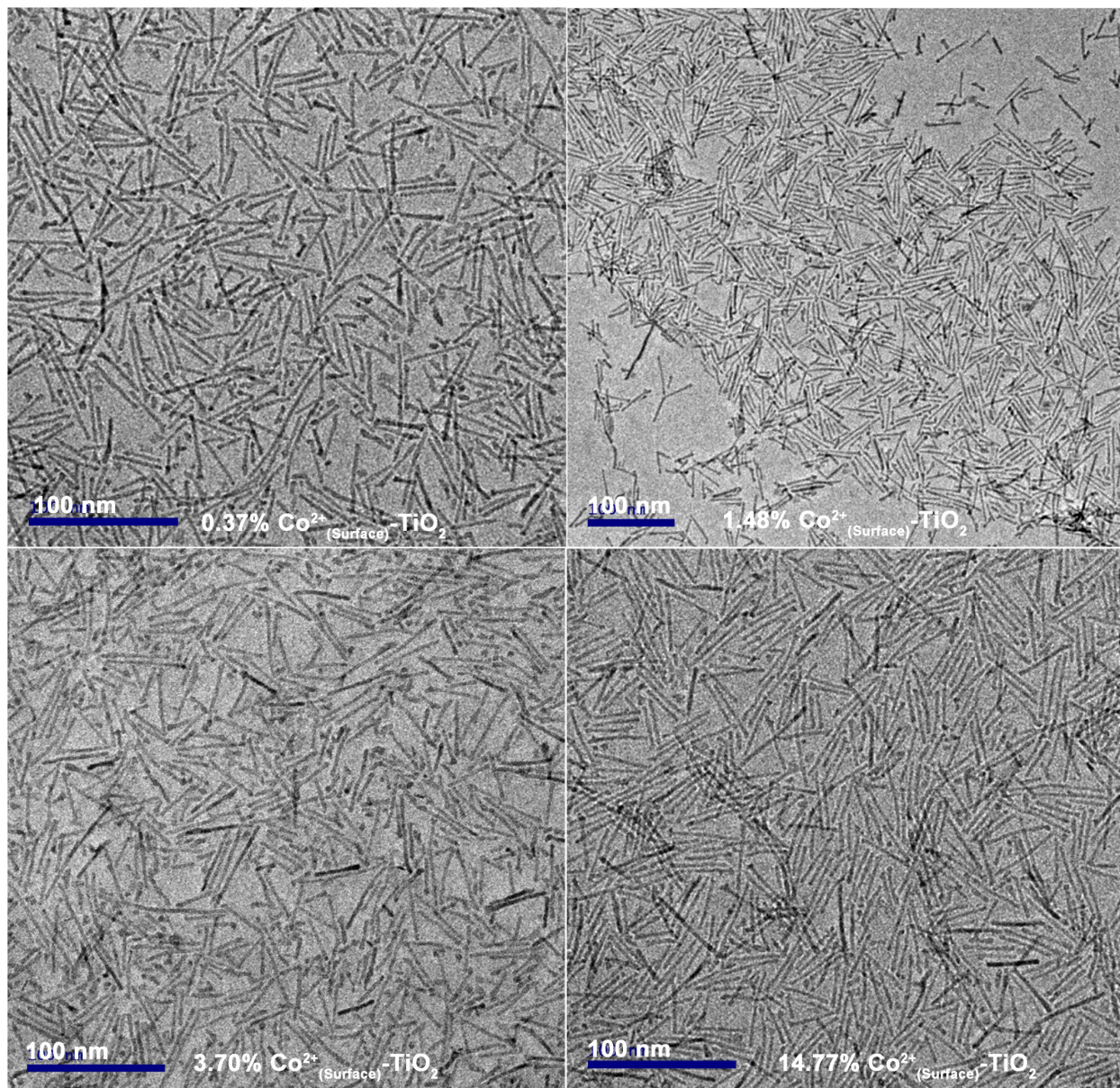
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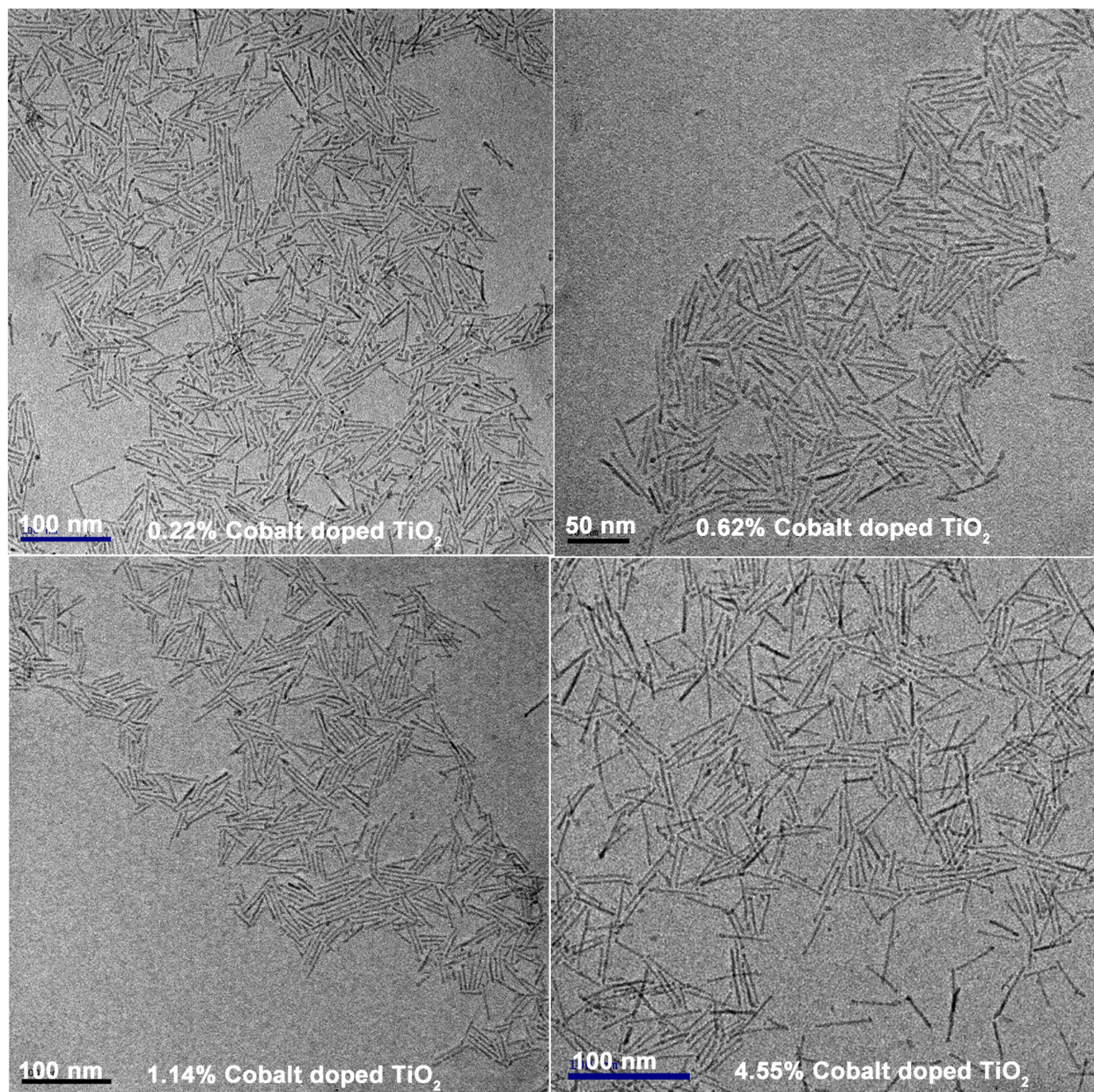
## Supporting information

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**Figure S1.** TEM images of  $\text{Co}^{2+}_{(\text{surface})}\text{-TiO}_2$ . Top left: 0.37%  $\text{Co}^{2+}_{(\text{surface})}\text{-TiO}_2$ . Top right: 1.48%  $\text{Co}^{2+}_{(\text{surface})}\text{-TiO}_2$ . Bottom left: 3.70%  $\text{Co}^{2+}_{(\text{surface})}\text{-TiO}_2$ . Bottom right: 14.77%  $\text{Co}^{2+}_{(\text{surface})}\text{-TiO}_2$ . All scale bars are 100 nm.



**Figure S2.** TEM images of  $\text{Co}^{2+}_{(\text{doped})}\text{-TiO}_2$ . Top left: 0.22%  $\text{Co}_{(\text{doped})}\text{-TiO}_2$ , scale bar = 100 nm. Top right: 0.62%  $\text{Co}_{(\text{doped})}\text{-TiO}_2$ , scale bar = 50 nm. Bottom left: 1.14%  $\text{Co}_{(\text{doped})}\text{-TiO}_2$ , scale bar = 100 nm. Bottom right: 4.55%  $\text{Co}_{(\text{doped})}\text{-TiO}_2$ , scale bar = 100 nm.

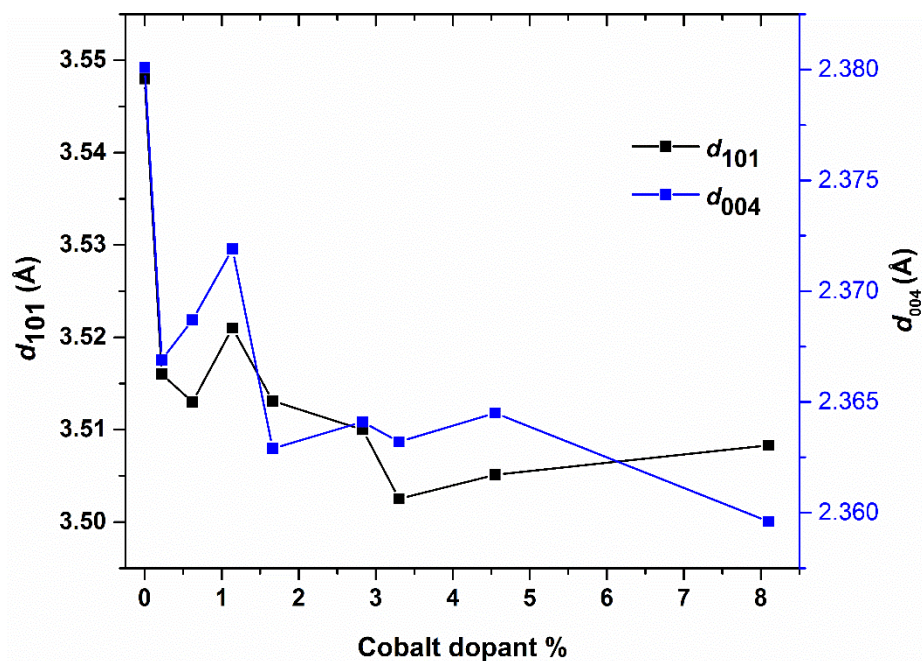


Figure S3. *d*-spacing of TiO<sub>2</sub> with different cobalt-dopant percentage.

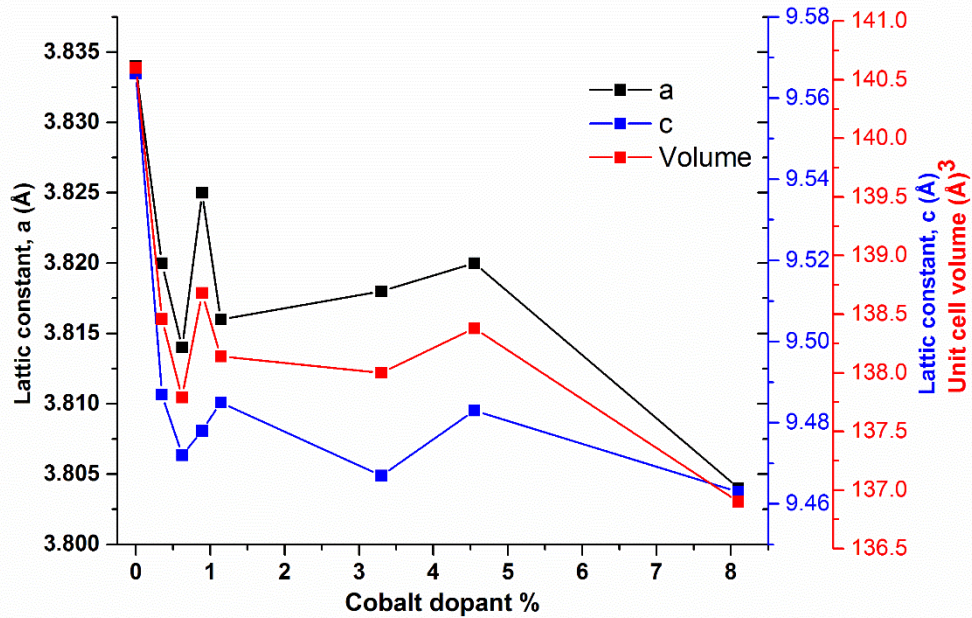
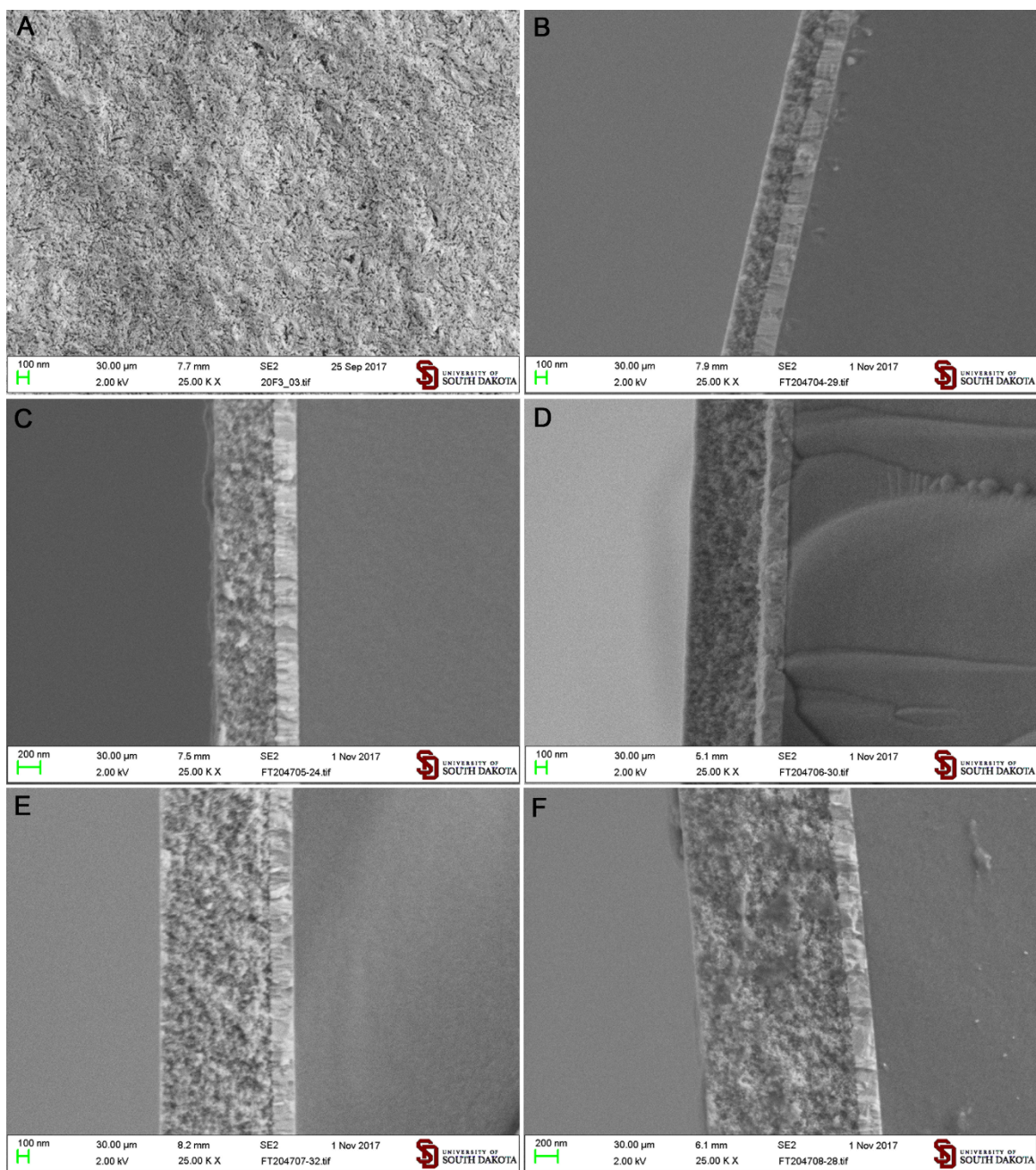


Figure S4. Unit cell parameters of TiO<sub>2</sub> with different cobalt-dopant percentage.



**Figure S5.** SEM images of prepared thin films with 2.83% cobalt doped TiO<sub>2</sub> nanorods. A) Top view; Cross sectional view of B) 2 layers of film, C) 4 layers of film, D) 6 layers of film, E) 8 layers of film, F) 10 layers of film.

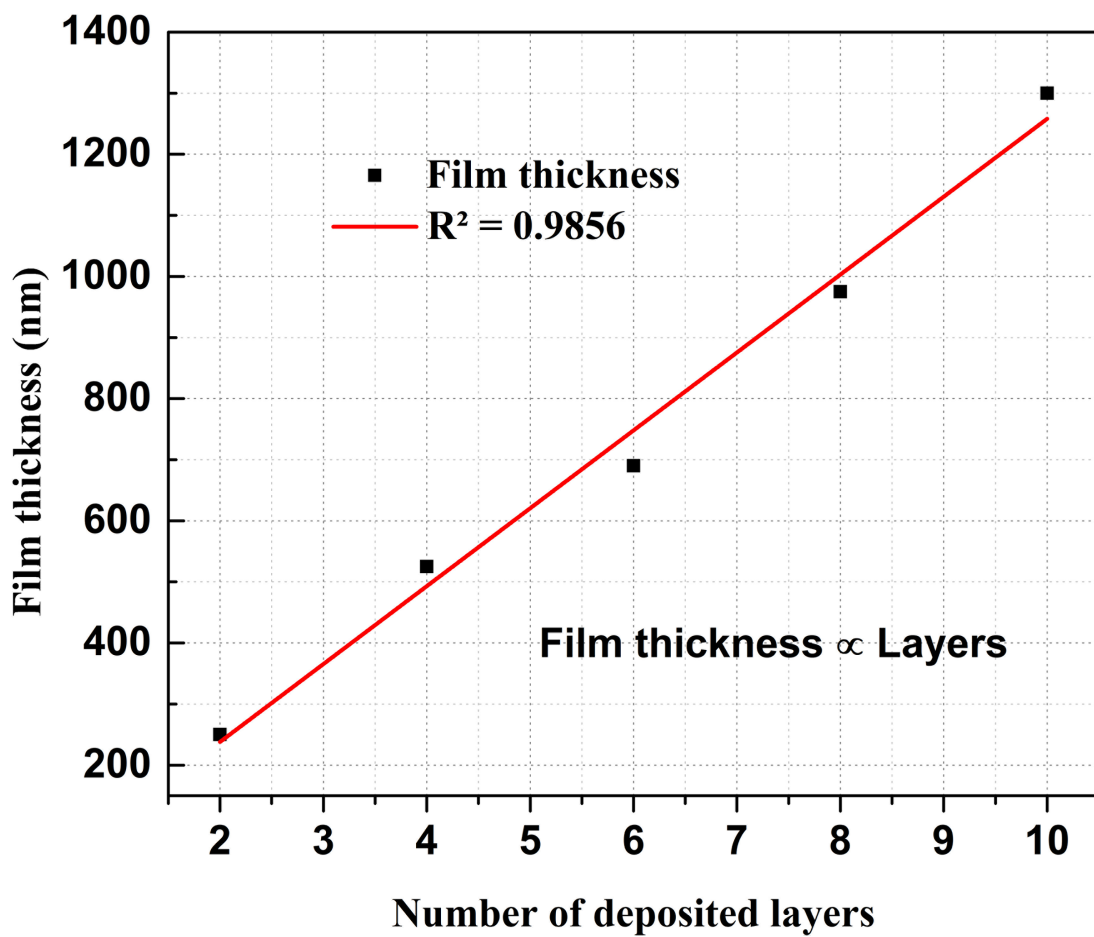


Figure S6. Film thickness versus number of deposition steps.