

Supporting Information

Figure S1. High-resolution transmission electron microscope (HRTEM) images from a $\text{SiO}_2/\text{P123}$ film after calcination. The images show the rectangular (2D-distorted hexagonal) structure of the film. The scale bar is 50 nm in both cases.

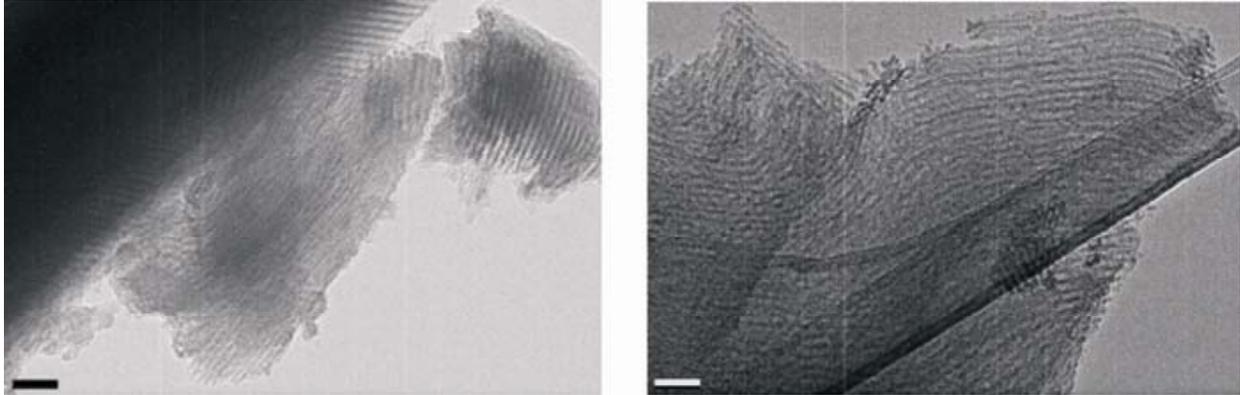


Figure S2. Plots of intensity vs. 2θ angle, derived from 1D vertical cuts of grazing incidence X-ray scattering (GISAXS) patterns of $\text{SiO}_2/\text{P123}$ calcined samples on glass, FTO and silicon.

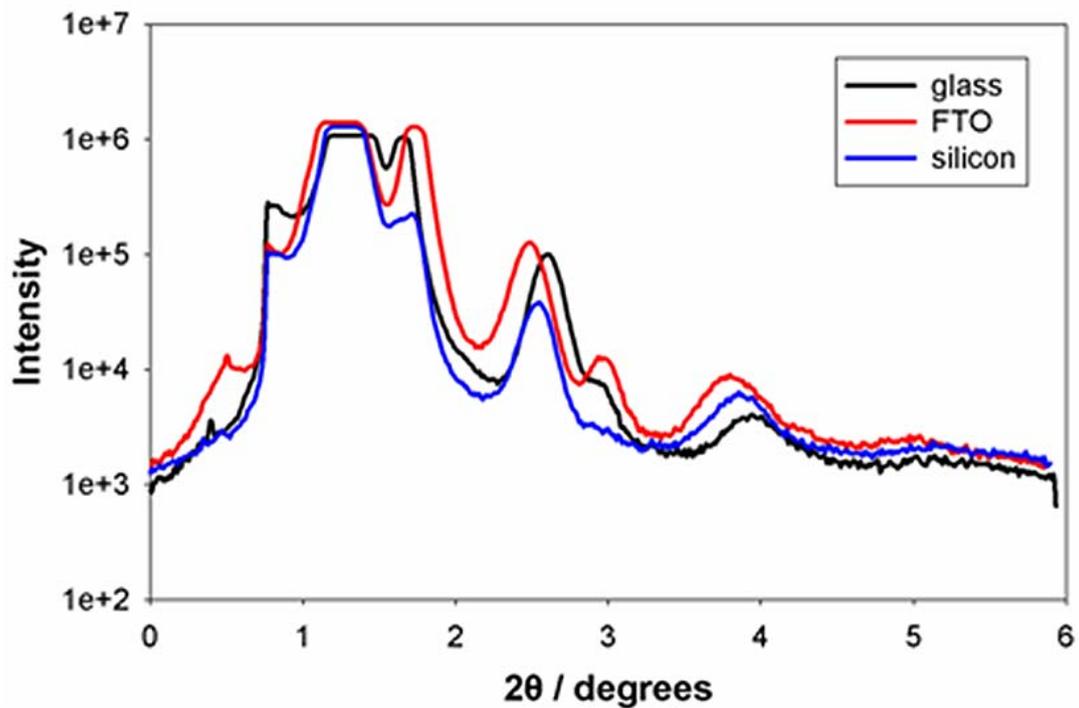


Figure S3. Typical GISAXS pattern of Fe-containing SiO₂/P123 film generated by co-precipitation prior to calcination.

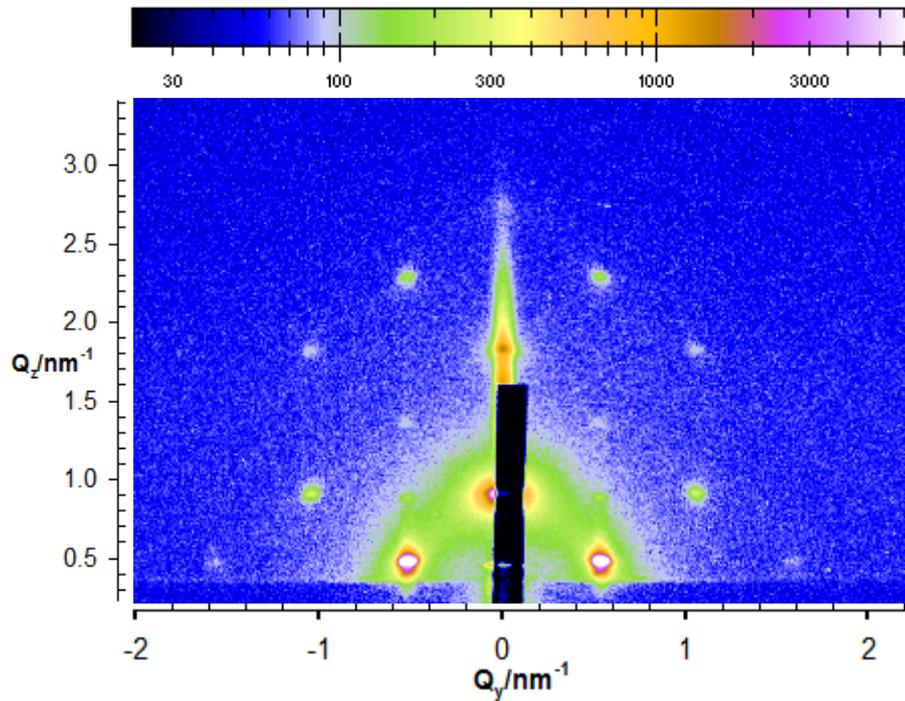


Figure S4. X-ray photoelectron spectroscopy (XPS) spectrum of a Fe-containing SiO₂ film obtained with the method of co-precipitation. The Fe 2p 3/2 and Fe 2p 1/2 bands are barely visible. In the O 1s part of the spectrum there is no evidence for a Fe–O peak.

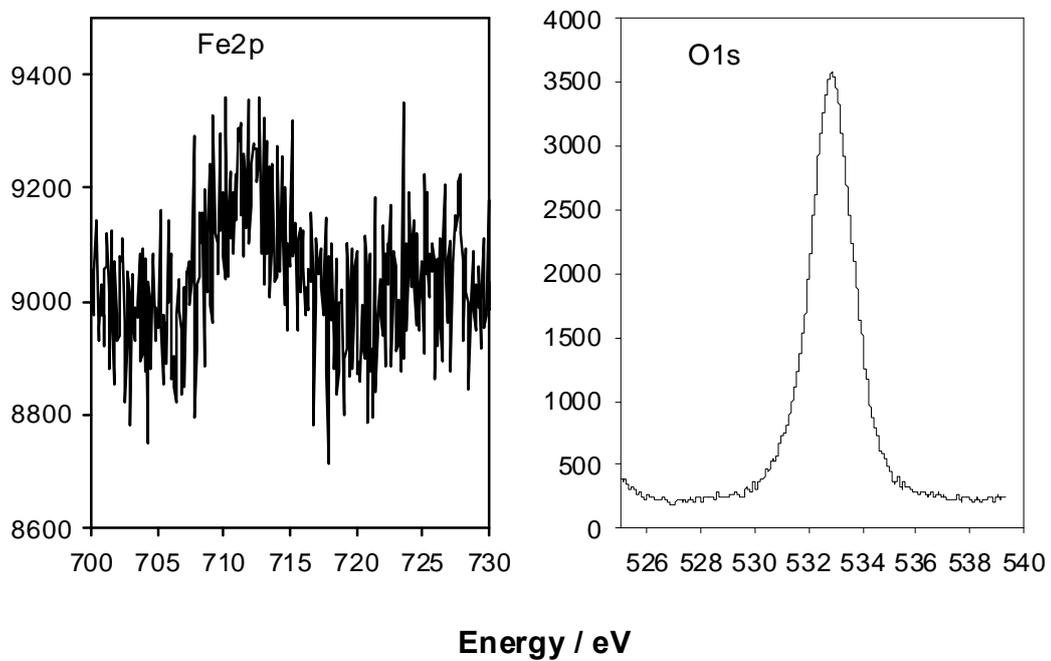


Figure S5. Ellipsometric optical functions of a Fe-containing film obtained from co-precipitation. The functions were fit using a uniform film of SiO₂ and voids in the Bruggemann effective medium approximation (BEMA) approximation and omitting Fe_xO_y. The experimental points (black) are connected with a continuous line, which is a guide to the eye. The red line is the BEMA fit.

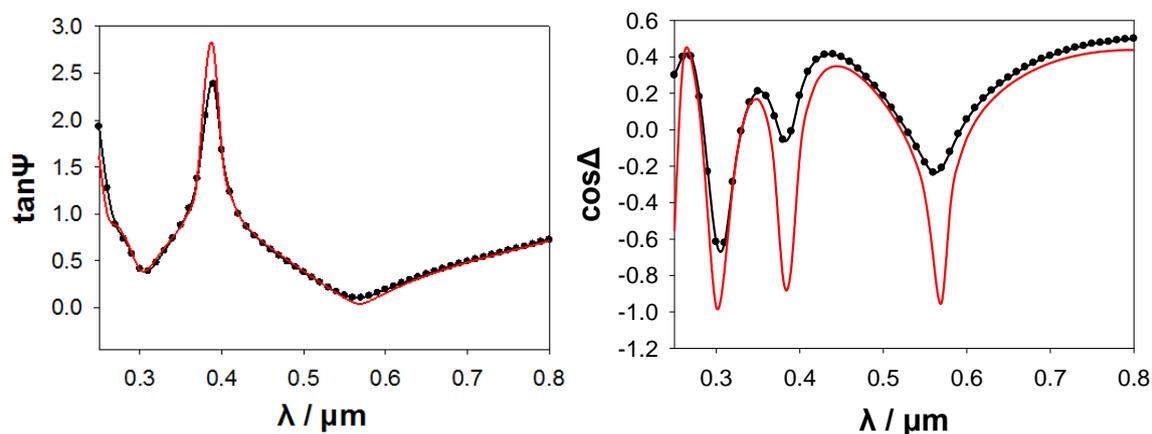


Figure S6. XPS spectrum of a Fe-containing SiO₂ film obtained with the method of impregnation. Left: The Fe 2p 3/2 and Fe 2p 1/2 bands are strong and reveal the presence of Fe³⁺ but not of metallic Fe, or Fe²⁺. Right: The O1s band can be deconvoluted and reveals the presence of a strong Fe–O band.

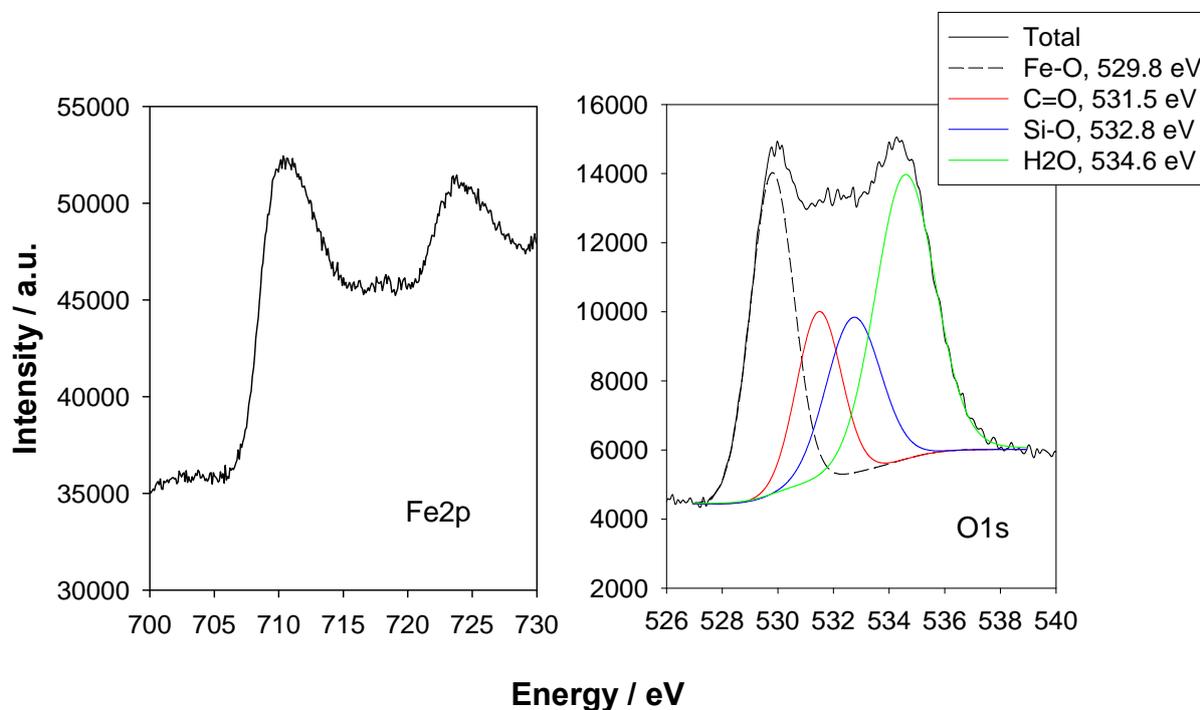
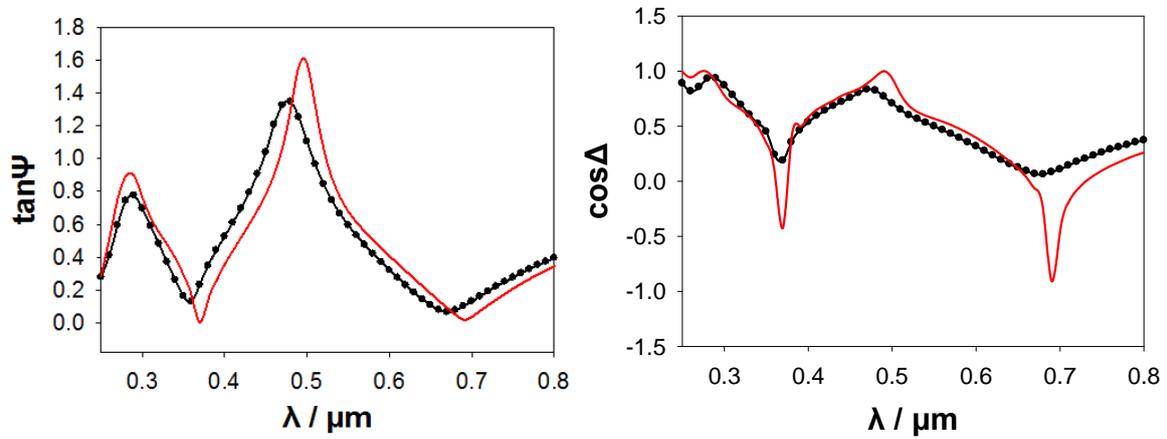


Figure S7. Ellipsometric optical functions of a Fe-containing film obtained by impregnation. The functions were fitted using a uniform film of hematite and voids on the top (BEMA film) and a bottom film of SiO₂ and voids (omitting Fe_xO_y) in the BEMA approximation.



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