




Synchrotron X-ray metrology of dopant distribution and oxidation state in high pressure CVD grown $\text{TM}^{2+}:\text{ZnSe}$ optical fibers: supplement

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Synchrotron X-Ray Metrology of Dopant Distribution and Oxidation State in High Pressure CVD Grown $\text{TM}^{2+}:\text{ZnSe}$ Optical Fibers: Supplemental Document

This supplemental information contains 4 figures. Figs S1 and S2 X-ray absorption spectra of the standard Fe and Cr compounds. Figs S3 and S4 contain the complete set of XANES spectra collected for the $\text{Cr}^{2+}:\text{ZnSe}$ and $\text{Fe}^{2+}:\text{ZnSe}$ optical fibers.

1. SUPPLEMENTAL INFORMATION

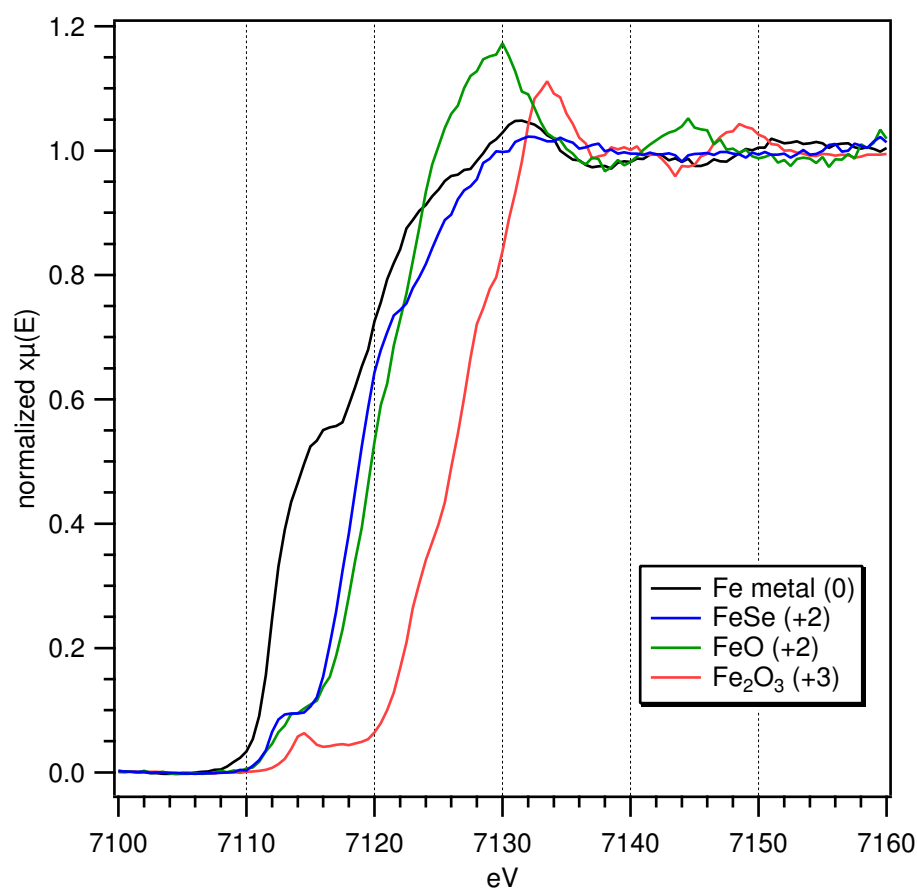


Fig. S1. Iron XANES standards and oxidation states: Fe metal (+0), FeSe (+2), FeO(+2), and Fe₂O₃ (+3).

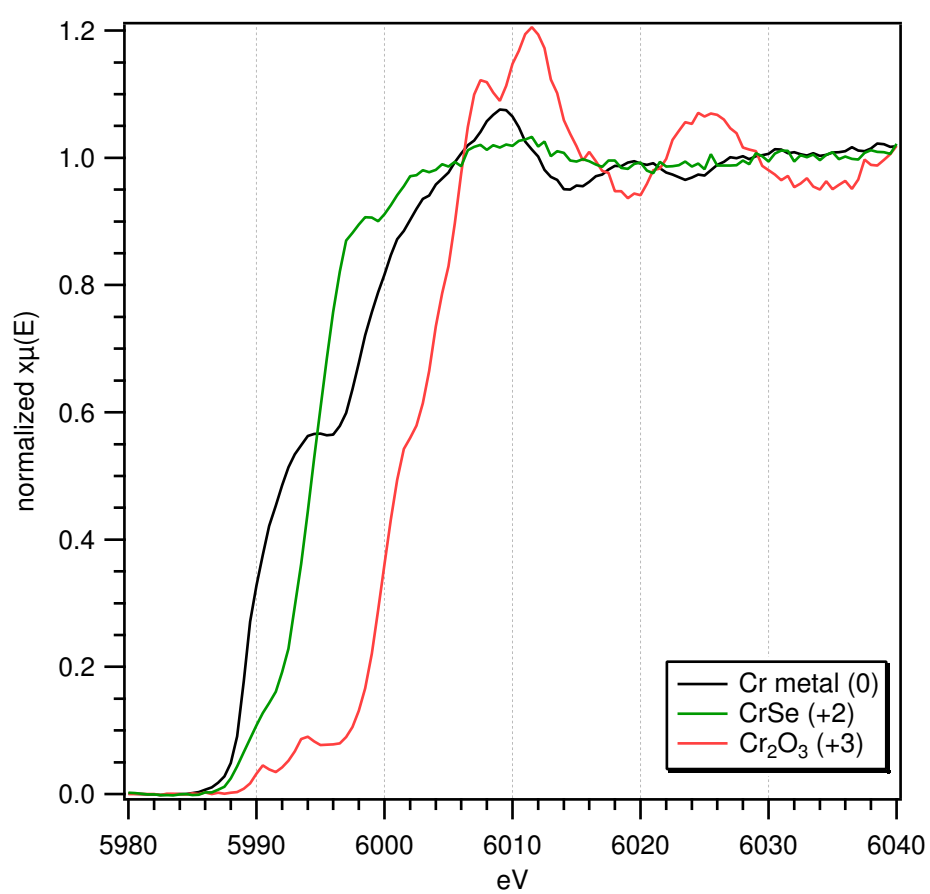


Fig. S2. Chromium XANES standards and oxidation states: Cr metal (+0), CrSe (+2), and Cr₂O₃ (+3).

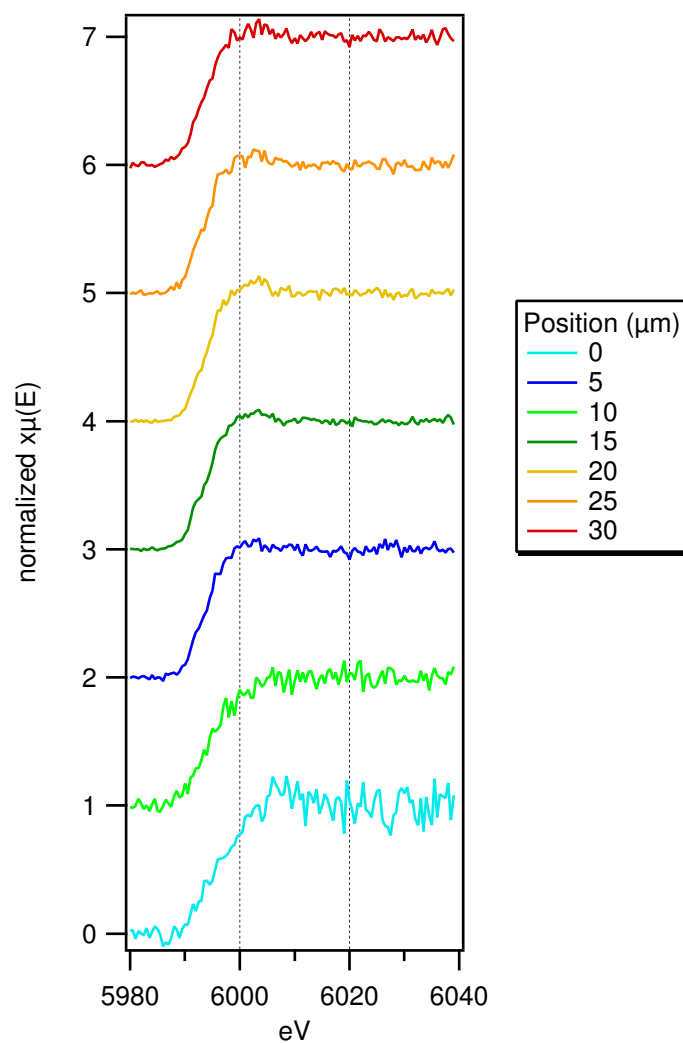


Fig. S3. Set of XANES spectra collected from the Cr^{2+} :ZnSe optical fiber. Position 0 starts at the outer edge of the sample. Subsequent scans take place at 5 μm intervals moving toward the center of the cross-section. The spectra from the interior of the sample show that the coordination environment for the Cr^{2+} is identical. However the spectra collected at positions 0 and 1 indicate sample oxidation at the outer surface, as indicated by the shifted edge energy.

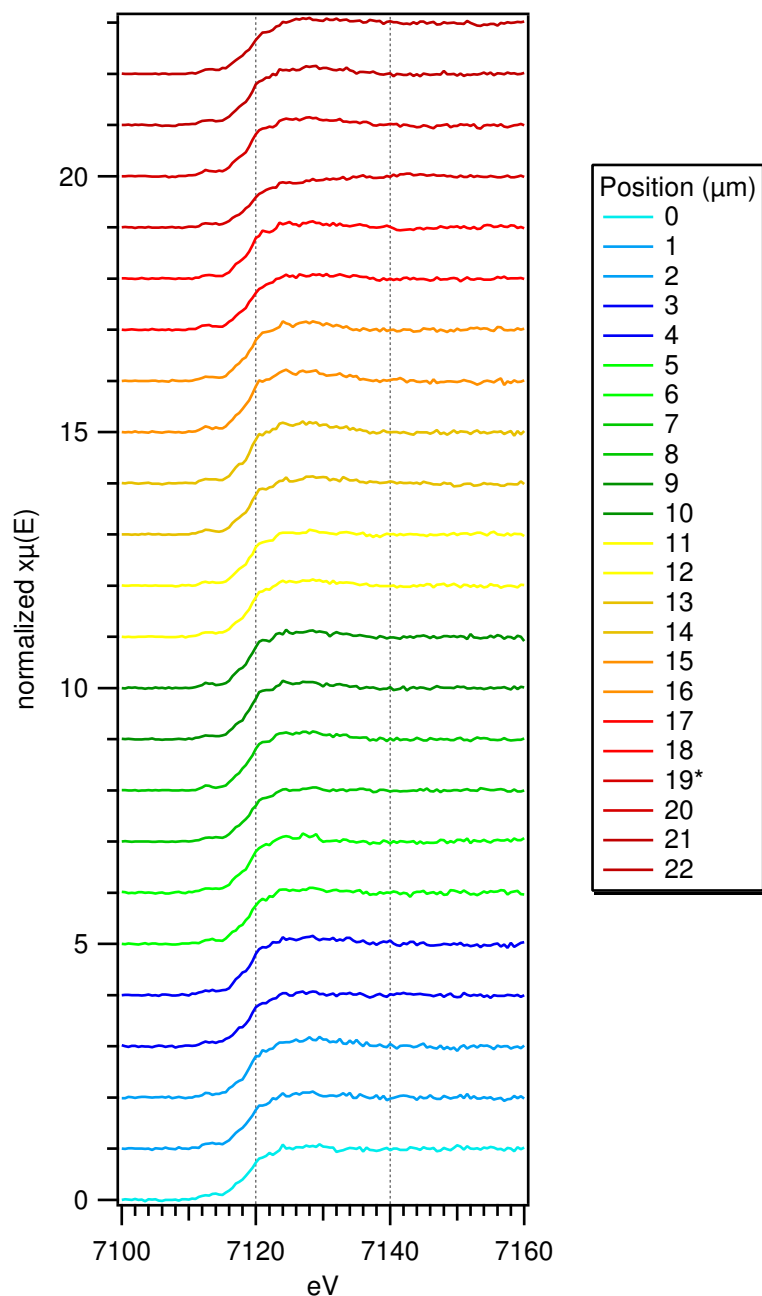


Fig. S4. Set of XANES spectra collected from the Fe^{2+} :ZnSe optical fiber. Position 0 starts at the outer edge of the sample. Subsequent scans take place at $1\ \mu\text{m}$ intervals moving toward the center of the cross-section. The spectra from the interior of the sample show that the coordination environment for the Fe^{2+} is mostly identical. The spectrum collected at position 19 is more similar to FeSe than Fe^{2+} :ZnSe and corresponds to a region that had a locally higher Fe concentration.