

Electronic Supplementary Information

Origin and Control of Room Temperature Ferromagnetism in Co,Zn-doped SnO₂: Oxygen Vacancies and their Local Environment

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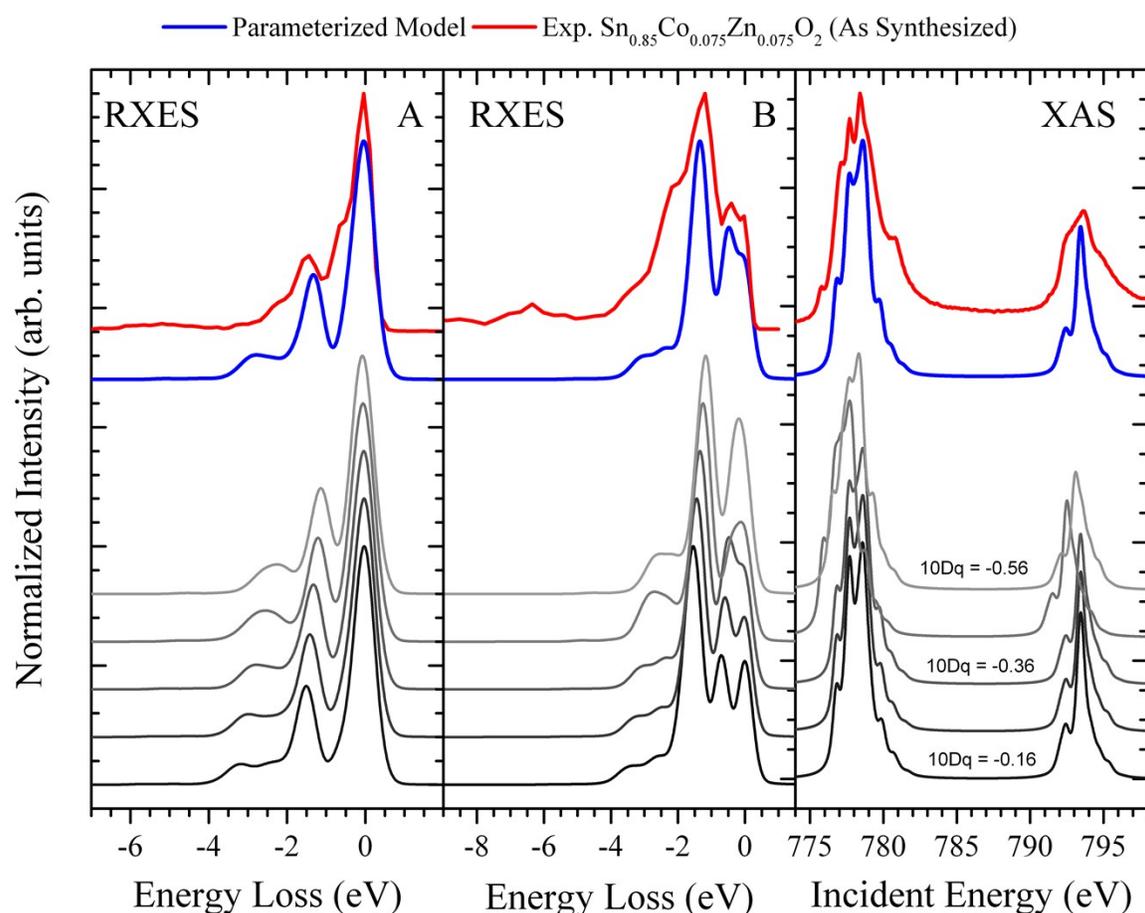


Figure S1: Comparison of experimental XAS (right) and RXES (left and center) spectra for as-synthesized (red) $\text{Sn}_{0.85}\text{Co}_{0.075}\text{Zn}_{0.075}\text{O}_2$ to the best parameterized calculation (blue, $10Dq=-0.360$, $D_s=-0.380$, $D_t=-0.429$, $F_{dd}=0.324$, $F_{pd}=0.530$, $G_{pd}=0.675$, $\zeta_{2p}=1.052$). How the calculated spectra vary with changes in $10Dq$ are shown in black-to-grey lines, from $10Dq=-0.16$ to $10Dq=-0.56$ in 0.10 increments in ascending order, as indicated.

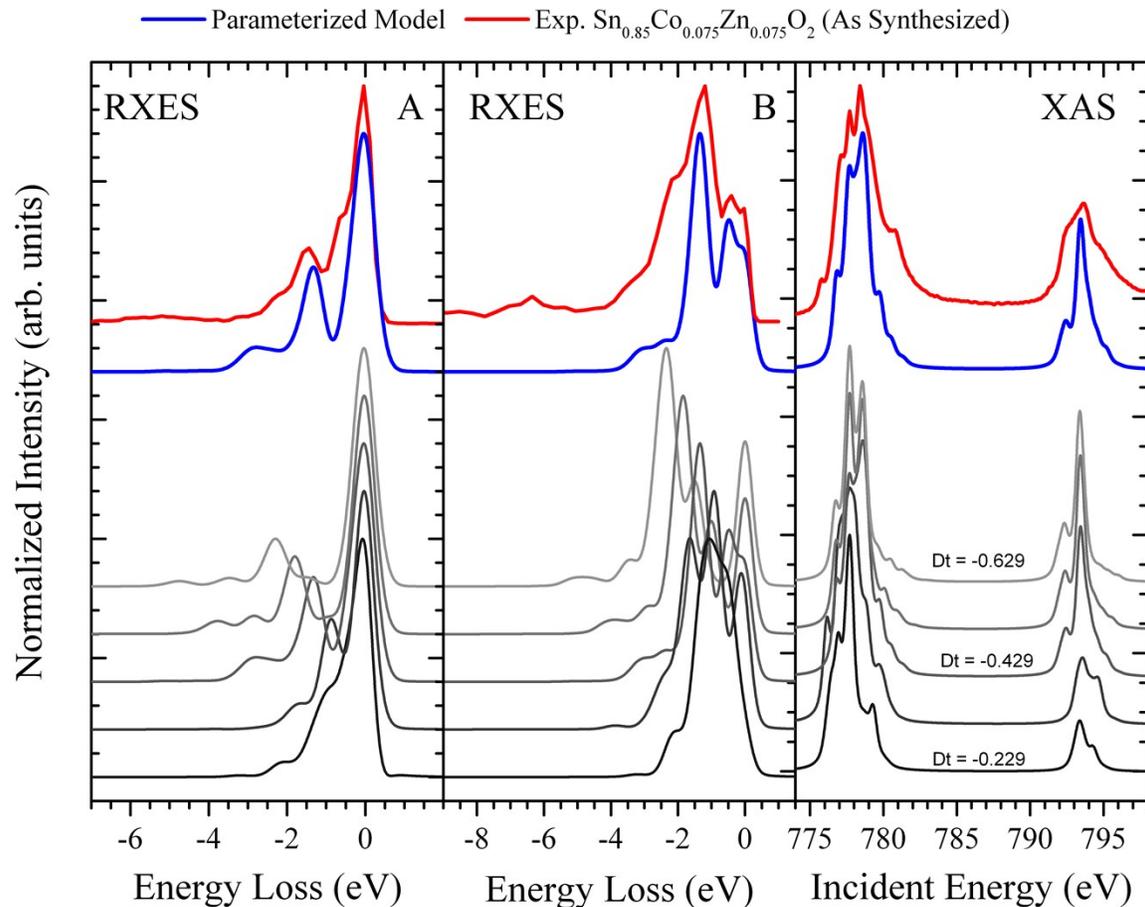


Figure S2: Comparison of experimental XAS (right) and RXES (left and center) spectra for as-synthesized (red) $\text{Sn}_{0.85}\text{Co}_{0.075}\text{Zn}_{0.075}\text{O}_2$ to the best parameterized calculation (blue, $10Dq=-0.360$, $Ds=-0.380$, $Dt=-0.429$, $F_{dd}=0.324$, $F_{pd}=0.530$, $G_{pd}=0.675$, $\zeta_{2p}=1.052$). How the calculated spectra vary with changes in Dt are shown in black-to-grey lines, from $Dt=-0.229$ to $Dt=-0.629$ in 0.10 increments in ascending order, as indicated.

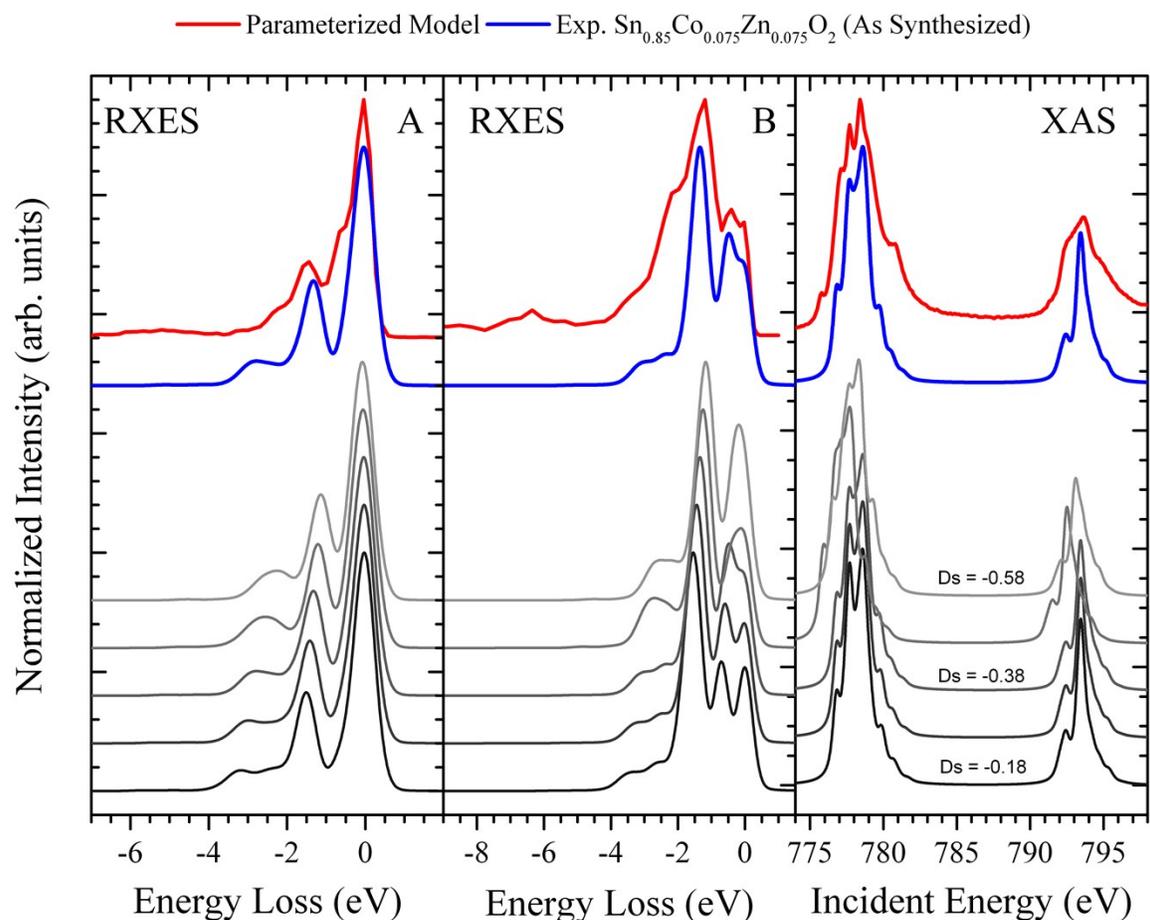


Figure S3: Comparison of experimental XAS (right) and RXES (left and center) spectra for as-synthesized (red) $\text{Sn}_{0.85}\text{Co}_{0.075}\text{Zn}_{0.075}\text{O}_2$ to the best parameterized calculation (blue, $10Dq=-0.360$, $Ds=-0.380$, $Dt=-0.429$, $F_{dd}=0.324$, $F_{pd}=0.530$, $G_{pd}=0.675$, $\zeta_{2p}=1.052$). How the calculated spectra vary with changes in Ds are shown in black-to-grey lines, from $Ds=-0.18$ to $Ds=-0.58$ in 0.10 increments in ascending order, as indicated.