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Soft x-ray magnetic circular dichroism study of valence and spin states in FeT_2O_4 (T = V, Cr) spinel oxides

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Electronic structures of spinel oxides FeT_2O_4 (T = V, Cr) have been investigated by employing soft x-ray magnetic circular dichroism (XMCD) and soft x-ray absorption spectroscopy (XAS). XAS reveals that Cr and V ions are trivalent, and that Fe ions are nearly divalent in FeT_2O_4 (T = V, Cr). Finite XMCD signals are observed in FeV_2O_4 at $T = 80$ K, while they are very weak in $FeCr_2O_4$. XMCD shows that Fe spins are antiparallel to V and Cr spins, with the V and Cr spins being canted from Fe spins, which suggests a Yafet-Kittel type triangular spin configuration in FeT_2O_4 (T = V, Cr). © *2013 American Institute of Physics*. [http://dx.doi.org/10.1063/1.4793769]