

An Extended X-Ray Absorption Fine Structure Study of CoTi Thin Films

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Abstract : The cobalt-titanium system was grown as thin films in an INTERCOVAMEX V3 sputtering system, equipped with four magnetrons assisted by DC pulsed and direct DC. A polished highly oriented (400) silicon wafer was used as substrate and the growing temperature was 500 oC. X-ray Absorption Spectroscopy experiments were carried out in the SSRL in the 4-3 beam line. The Extended X-Ray Absorption Fine Structure spectra have been numerically processed by WINXAS software from the background subtraction until the normalization and FFT adjustment. Analyzing the absorption spectra of cobalt in the CoTi₂ phase we can appreciate that they agree in energy with the reference spectra that corresponds to the CoO, which indicates that the valence where upon working is Co²⁺. The RDF experimental results were then compared with those RDF's generated theoretically by using FEFF software, from a model compound of CoTi₂ phase obtained by XRD. The fitting procedure is a highly iterative process. Fits are also checked in R-space using both the real and imaginary parts of Fourier transform. Finally, the presence of overlapping coordination shells and the correctness of the assumption about the nature of the coordinating atom were checked.

Keywords : XAS, EXAFS, FEFF, CoTi

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