# 広域 X 線吸収微細構造による コランダム型酸化物薄膜の Ir 置換サイトの解析

## Ir substitution site analysis of Corundum-type oxide films by extended X-ray absorption fine structure

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$Cr_2O_3$ and $\alpha$-$Fe_2O_3$ are Corundum-type oxide antiferromagnets. $Cr_2O_3$ is a well-known magnetoelectric material and attract much attentions as an electrically controllable antiferromagnet [1]. $\alpha$-$Fe_2O_3$ is a high Néel temperature antiferromagnet ($T_N$ ~ 950 K), which has a spin reorientation transition called Morin transition. We've been reported the enhancement of Morin transition temperature (thus enhancement of perpendicular magnetic anisotropy (PMA)) for $\alpha$-$Fe_2O_3$ by tiny amount of Ir-doping [2,3]. In contrast, we didn't observe a distinguish change in PMA for $Cr_2O_3$ by Ir-doping. To investigate the difference, in this study, we tried to identify the Ir-substitution site in both $Cr_2O_3$ and $\alpha$-$Fe_2O_3$ from extended X-ray absorption fine structure (EXAFS) analysis.

Ir-doped $Cr_2O_3$ and $\alpha$-$Fe_2O_3$ films were fabricated on $Al_2O_3$ (0001) substrate by a reactive sputtering method. We simulated radial distribution function $|\chi(R)|$ of Ir $L_3$ edge with three different substitution site; 1) cation (Cr or Fe) site, 2) O-site, and 3) interstitial-site, as shown in Fig. 1. Then we fitted experimentally obtained $|\chi(R)|$ by the three simulation results. The fitting results indicate that Ir most likely substitute cation site of both $Cr_2O_3$ and $\alpha$-$Fe_2O_3$, rather than interstitial-site and O-site.

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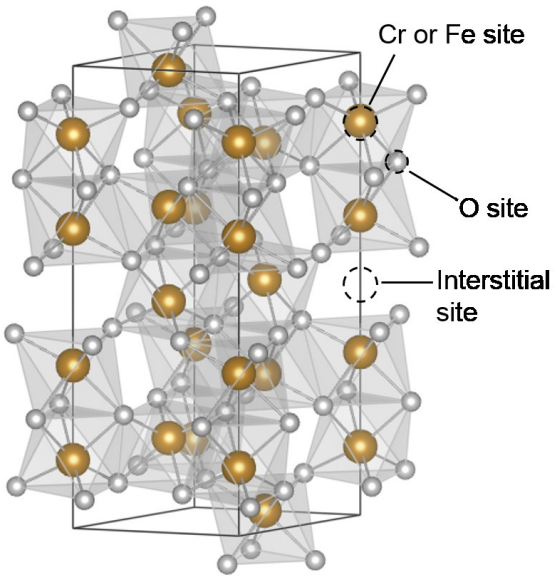


Fig. 1 Schematics of the simulated Ir-substitution site in Corundum-type oxide.