

Thermopower and Co K-edge Studies of Potassium Sodium Cobalt Oxyhydrates

$\text{Na}_{0.33}\text{K}_{0.02}(\text{H}_2\text{O})_{1.33}\text{CoO}_{2-\delta}$ and $\text{Na}_{0.07}\text{K}_{0.21}(\text{H}_2\text{O})_{0.63}\text{CoO}_{2-\delta}$

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We report measurements of the thermopower and Co K-edge x-ray absorption spectroscopy on bilayer and monolayer $(\text{Na,K})_x(\text{H}_2\text{O})_y\text{CoO}_{2-\delta}$. According to the Co K-edge x-ray absorption spectra, the Co oxidation number for bilayer hydrate $\text{Na}_{0.33}\text{K}_{0.02}(\text{H}_2\text{O})_{1.33}\text{CoO}_{2-\delta}$ is higher than that of monolayer hydrate $\text{Na}_{0.07}\text{K}_{0.21}(\text{H}_2\text{O})_{0.63}\text{CoO}_{2-\delta}$ with a chemical shift of 3.5 eV, which is in sharp contrast with Co K-edge x-ray

absorption spectroscopy and cerimetric titration results for $\text{Na}_x(\text{H}_2\text{O})_y\text{CoO}_{2-\delta}$, where there is essentially no difference of the oxidation number of Co between bilayer and monolayer sodium cobalt oxyhydrates. According to thermopower analysis, band narrowing is observed when $\gamma\text{-Na}_{0.7}\text{CoO}_2$ is transformed to potassium sodium cobalt oxyhydrates.