

令和5年1月25日

公益社団法人 応用物理学会

北海道支部 会員各位

応用物理学会北海道支部講演会のお知らせ

下記講演会を開催いたしますので、多数ご参加下さいますようご案内申し上げます。

【演題】 Unique Co<sup>2+</sup> stabilization in oxygen sponge SrFe<sub>0.5</sub>Co<sub>0.5</sub>O<sub>x</sub>

(酸素スポンジ SrFe<sub>0.5</sub>Co<sub>0.5</sub>O<sub>x</sub> における Co<sup>2+</sup>安定化)

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【日時】 2023年2月14日 13:30-14:30

【場所】 北海道大学電子科学研究所 1F 会議室

【主催】 応用物理学会北海道支部

【講演要旨】

Complex oxides have gotten lots of attention due to diverse electronic/magnetic phases and their tunability by external stimuli such as strain, magnetic fields, electric fields, etc. In addition, mixed ionic and electronic conducting behaviors in complex oxides have been applied for many energy devices such as solid oxide fuel cells (SOFCs) and electrochemical sensors, where redox reactions and catalytic activity at the interfaces of gas-solid and solid-liquid play critical roles for the performance. The primary purpose of this presentation is to address surface ion-exchange behaviors that can be used for controlling phase in epitaxial complex oxides. As a model system, we chose the oxygen sponge SrFe<sub>0.5</sub>Co<sub>0.5</sub>O<sub>x</sub> grown by pulsed laser deposition. Upon facile gas reaction at moderate temperature (~400 °C), selective reduction in SrFe<sub>0.5</sub>Co<sub>0.5</sub>O<sub>2.5</sub> occurs. This results in the stabilization of unique Co<sup>2+</sup> state largely due to the loss of oxygen in the lattices. Such valence state transition induces structural phase transition and band gap modification. In addition, using real-time x-ray diffraction and dc transport measurements at the moderate temperature, we probe reversible redox reaction in SrFe<sub>0.5</sub>Co<sub>0.5</sub>O<sub>x</sub>, which can be applicable to not only a cathode in SOFCs but also electrochemical sensors due to realization of electronically three distinct states.

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