

## 場の応答性を高めたエンジニアードエレクトロニクス材料の創製

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### 研究成果の概要

環境調和元素を用いた高性能エレクトロニクス材料の開発を目的とした研究を行った。特に外場(電界・磁界)に対する応答に着目し、薄膜界面制御・結晶構造制御・ドメイン制御により次の3つに挙げる項目を達成した。

- ① 薄膜界面相互作用の制御により電界による磁性の変調に成功した。
- ② 試料結晶内の酸素数制御により、電界による高速抵抗スイッチング特性を実現した。
- ③ 強誘電体ドメイン制御により高い縦効果結合係数を得ることに成功した。

### 雑誌論文(計 15 件)

1. "Preparation and magnetic properties of  $\text{SrFeO}_{3-x}$  ( $x = 0.25 \sim 0.5$ ) using Radio Frequency magnetron sputtering method optimized by sputtering plasma analyses"  
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3. "Influence of an External Magnetic Field on Injected Charges of a  $\text{Cr}_2\text{O}_3$ /Fe/ $\text{CeO}_2$ /Si MIS Capacitor"  
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5. "Electrical Properties and Phase Transition Behavior of (Li,Na,Ba)(Nb,Ti) $\text{O}_3$  Lead-Free Piezoelectric Ceramics"  
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12. “Dielectric and Piezoelectric properties of (Na,Ba)(Nb,Ti)O<sub>3</sub> Lead-free Piezoelectric Ceramics”

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T. Yokota, Y. Tsuboi, S. Murata, S. Kito, and M. Gomi, 371–374 (2009)

2. “Magneto–charge injection property Cr<sub>2</sub>O<sub>3</sub>/Ferromagnetic filter/Cr<sub>2</sub>O<sub>3-x</sub>/Ferromagnetic filter/CeO<sub>2</sub>/Si MIS capacitor”

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3. “Electric Field Induced Resistance Changes in SrFeO<sub>2+x</sub> Thin Films with Various Oxygen Contents”

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5. “Phase Transition Temperature Shift of (Li,Na)NbO<sub>3</sub> Lead-Free Piezoelectric Ceramics by High–Electrical–Field Poling”

R. Aoyagi, M. IWATA, M. Maeda,

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横田 壮司、坪井康敏、鬼頭伸也、井村 廉平、五味 学、  
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Takeshi YOKOTA, Sinya KITO, Qi XIA, Miloslaw BATENTSCHUK, Manabu GOMI and Christoph J. BRABEC,  
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18. “Room Temperature Magneto-electric Effects of Cr<sub>2</sub>O<sub>3</sub>/Cr<sub>2</sub>O<sub>3</sub>±X/LiNbO<sub>3</sub>/Cr<sub>2</sub>O<sub>3</sub>±X/Cr<sub>2</sub>O<sub>3</sub> Hetero Structure”

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大橋敬之, 新井信帆, 山田智文, 青柳倫太郎,  
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24. “(Li,Na)NbO<sub>3</sub> 系非鉛圧電セラミックスの分極反転と圧電特性”  
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25. “(Li,Na)NbO<sub>3</sub> 系非鉛圧電セラミックスの分極反転と電気的特性”  
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