



BL-11 超軟 X 線 XAFS ビームライン

◆概要

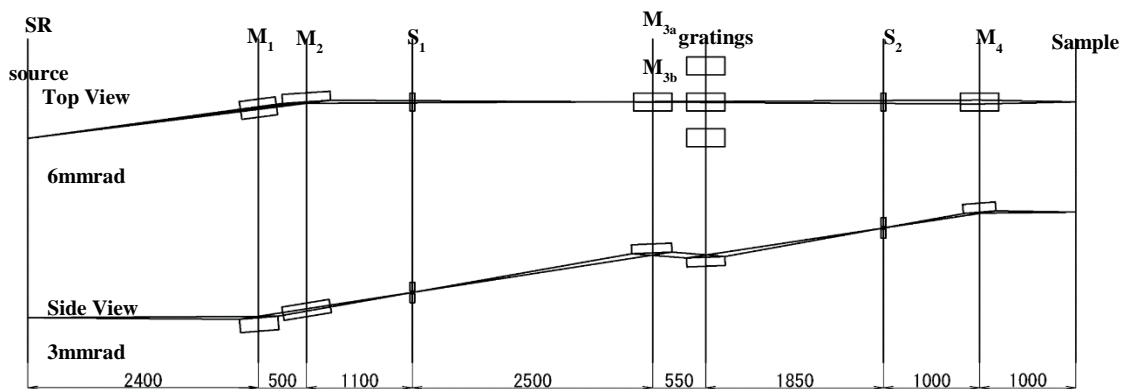
立命館大学SR センター BL-11 はMonk-Gillieson型光学系を採用し、3種類の不等間隔溝平面回折格子、2種類の偏角を取り換えることで、40～1200 eV のエネルギー領域をカバーしている。K吸収端ではLi～F、L吸収端では、Na～Cuの測定が可能である。軽元素を含む機能性材料の評価に利用されている。特に、電池材料など嫌気性試料の測定の場合、グローブボックスから大気非暴露で輸送・測定するトランスファーベッセルをBL-2、10、13と共通に利用することが可能である。また、部分電子収量法、全電子収量法、蛍光X線収量法による同時測定が可能で、深さ分解情報を得ることも可能になっている。平成13年度文科省共用促進事業高度化予算により建設された。

◆ビームラインの構成

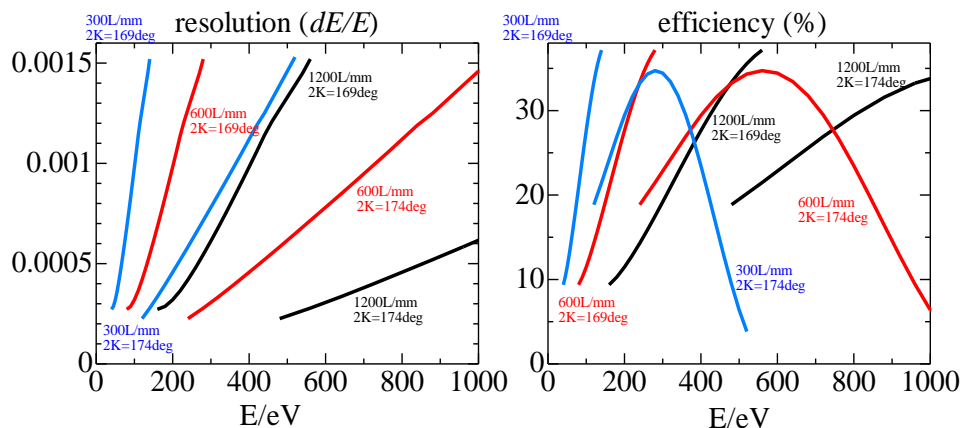


エネルギー範囲	40 ~ 1200 eV
ビーム取り込み角	6 mrad ^H x 3 mrad ^V
不等間隔平面回折格子	300 lines/mm (24, 48nm) 900 lines/mm (7, 14 nm)
刻線密度(溝深さ)	1200 lines/mm (6nm)
偏角	174° (高エネルギー用) 169° (低エネルギー用)
ビームサイズ	2 mm ^H x 2 mm ^V
検出モード	部分電子収量(MCP) 全電子収量(リーク電流) 蛍光X線収量(SDD)

◆光学系のレイアウト

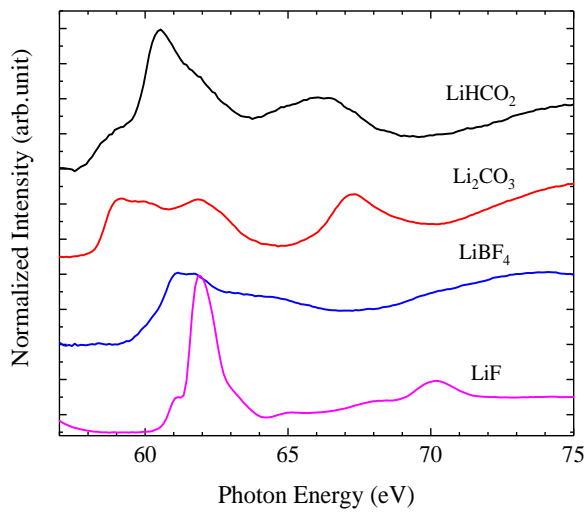


◆3種類の回折格子の仕様

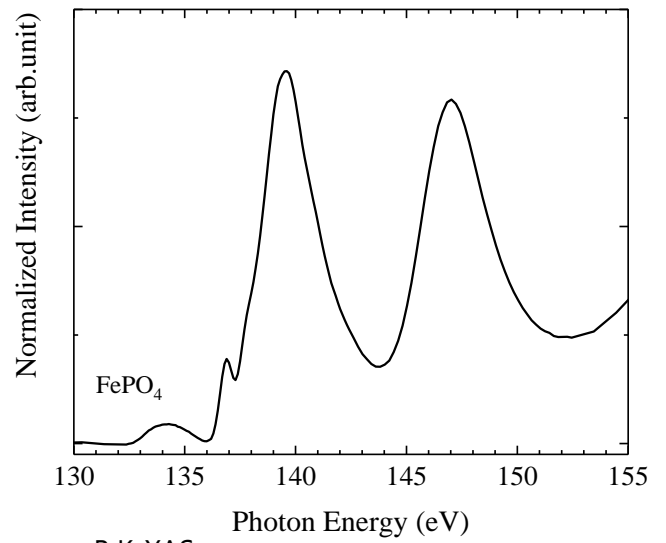


◆標準試料のスペクトル

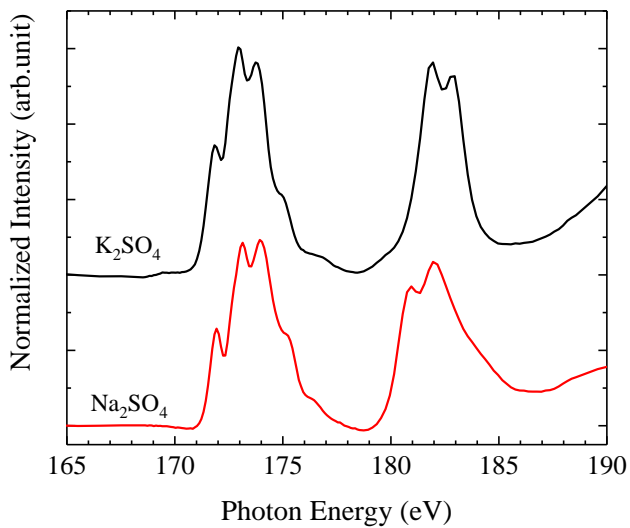
Li K-XAS



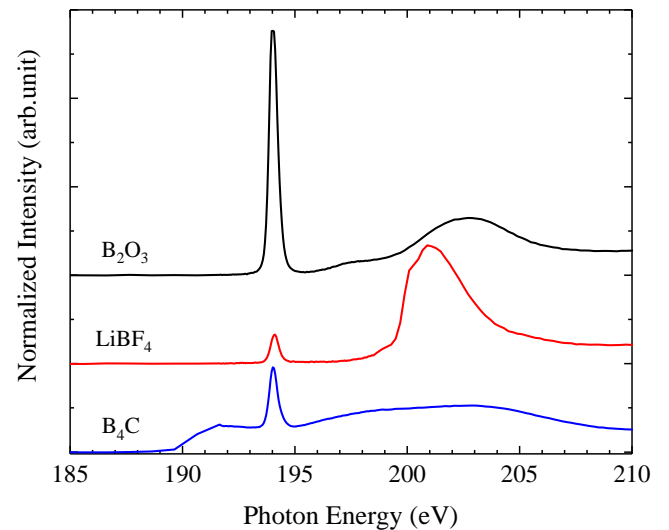
P L-XAS



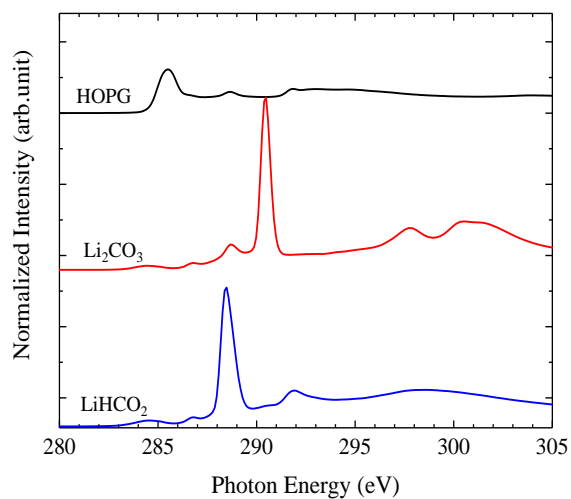
S L-XAS



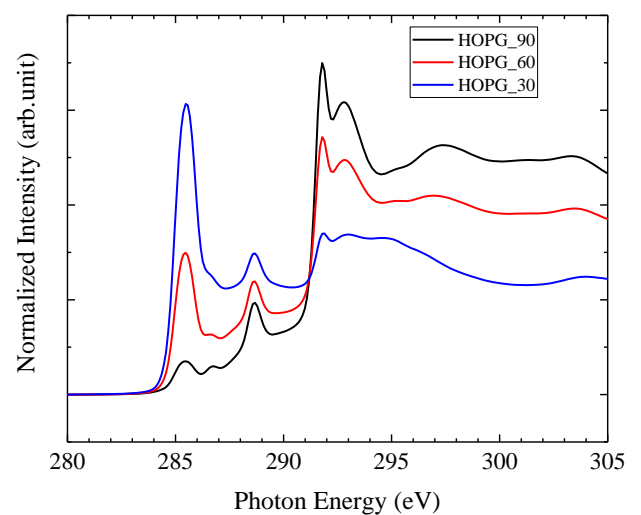
B K-XAS

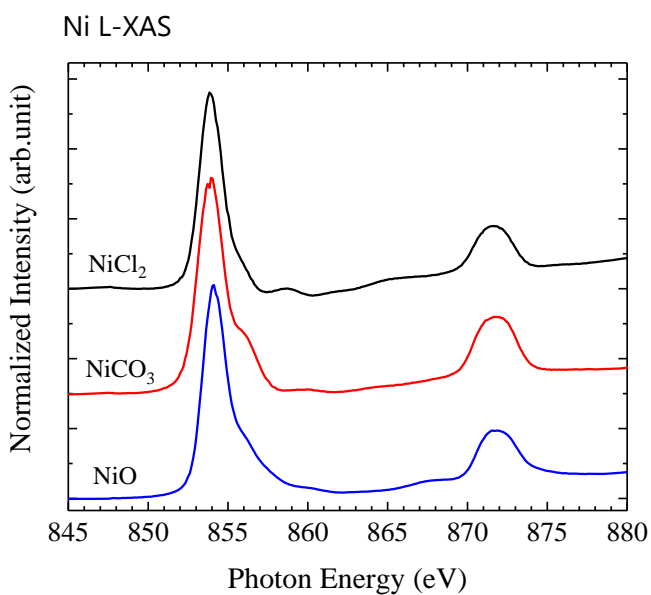
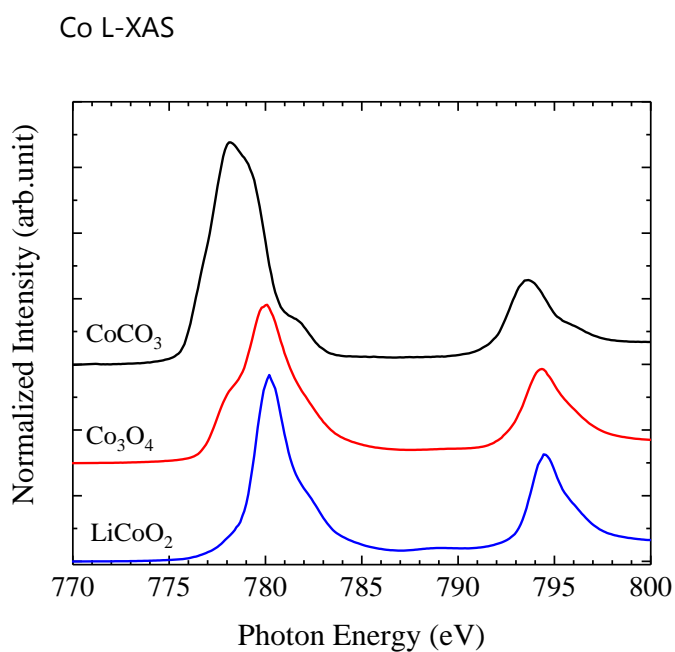
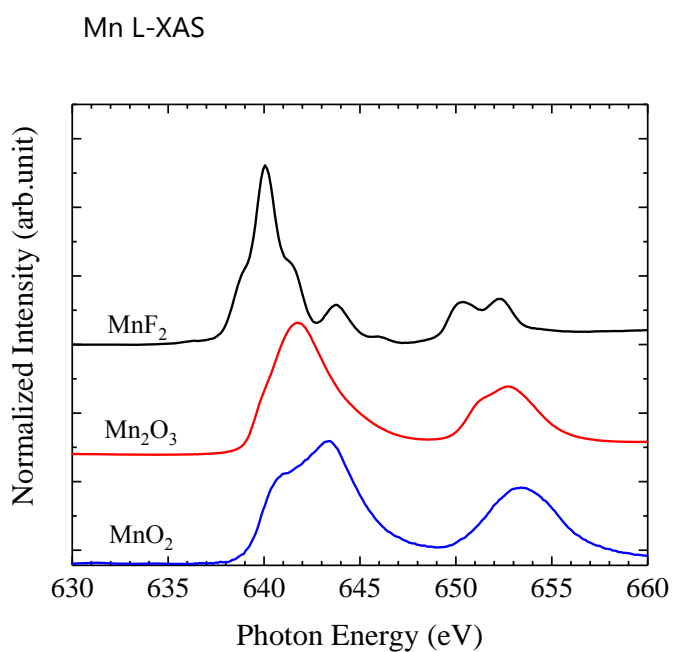
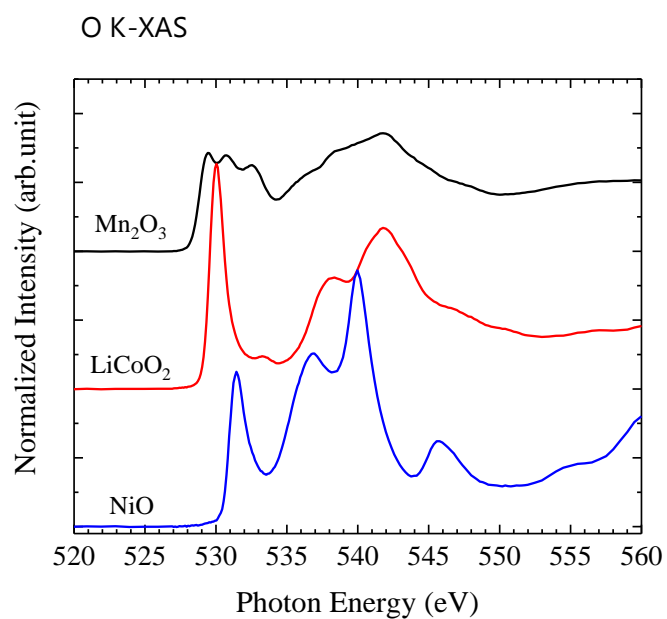
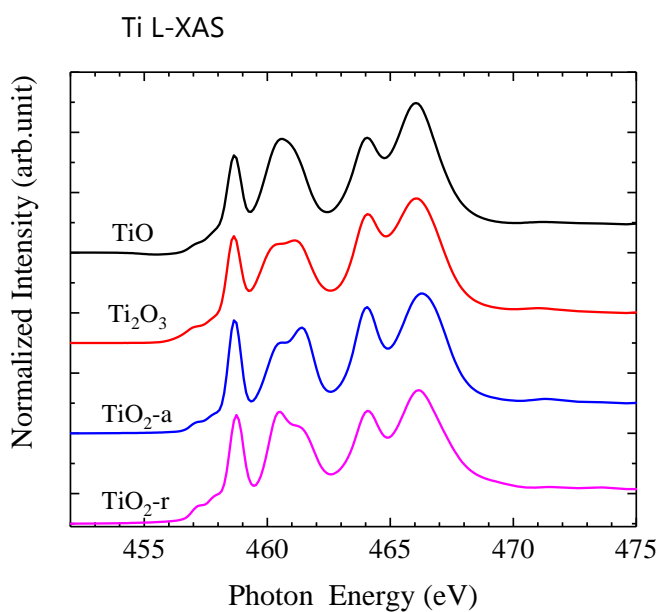


C K-XAS



C K-XAS of HOPG





◆BL-11の利用で発表された論文

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- (3) N. Yabuuchi, M. Takeuchi, M. Nakayama, H. Shiiba, M. Ogawa, K. Nakayama, T. Ohta, D. Endo, T. Ozaki, T. Inamasu, and S. Komaba," New High-Capacity Electrode Materials for Rechargeable Lithium Batteries: Li_3NbO_4 -based System with Cation Disordered Rocksalt Structure" *Proceedings of National Academy of Science* **112** (2015) 7650-7655 (IF 9.8)
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- (8) K. Yamanaka, M.Ohishi, K. Nakanishi, I. Watanabe, and T.Ohta, "Charge compensation analysis of Li-rich layered oxide positive electrode using X-ray absorption fine structure measurement in the soft X-ray region" *Adv. X-ray Chem. Anl. Japan* **47** (2016) 321-331 (in Japanese).
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