

2012A 期 採択長期利用課題の中間評価について

公益財団法人高輝度光科学研究センター
利用業務部

第46回 SPring-8利用研究課題審査委員会長期利用分科会（平成25年10月）において、2012A 期に採択された1件の長期利用課題の中間評価が行われました。

長期利用課題の中間評価は、実験開始から1年半が経過した課題の実験責任者が成果報告を行い、長期利用分科会が、対象課題の3年目の実験を実施するかどうかの判断を行うものです。以下に対象課題の評価結果および評価コメントを示します。

課題名	Development of Spin-HAXPES technique for the Exploration of the Electronic structure of Buried layers and Interfaces
実験責任者(所属)	Claudia Felser (Max Planck Institute of chemical physics of solids)
採択時の課題番号	2012A0043
利用ビームライン	BL47XU
評価結果	3年目を実施する

〔評価コメント〕

The aim of this long-term proposal is to develop spin polarized high-resolution hard x-ray photoemission spectroscopy (SPIN-HAXPES) technique, which is expected to play an essential role in investigating materials concerning spintronics devices. The review committee agrees that this bulk-sensitive spin-resolved technique is essential to investigate electronic and magnetic structures of buried layers and interfaces of such devices and appreciates the potential impact on the field. The committee appreciates also the HAXPES results, as well as new developments such as in-operand HAXPES, obtained by the group in 2012A and B. The committee, however, has a great concern about the significant delay of the main part of the project i.e., “SPIN”-HAXPES. In 2012A and B, the group faced the problems of a broken power supply and a broken detector and as a result they

could not perform the planned spin-resolved experiments. In 2013A, the group succeeded to make the overall system (Scienta analyser + SPLEED-type spin detector) work, but found extremely low counts and consequently could not observe spin-resolved signals. The construction of the 2D detection system is also delaying significantly. Although the committee concludes that it is appropriate to give another year for this long-term project, noting the significance and importance of the realization of SPIN-HAXPES, the committee strongly requests to the group to prepare the experiments carefully, testing the power supply, the lens system, and the detectors prior to each beam time. Also the committee requests the group to estimate the count rates of the spin-resolved signals based on the cross sections, available photon numbers, estimated transmission and detection efficiency for the entire system, and define the most reasonable photon energy for bulk-sensitive SPIN-HAXPES.

〔成果リスト〕

(査読付)

[1] SPring-8 publication ID = 23225

S. Ouardi, T. Kubota, G. H. Fecher, R. Stinshoff, S. Mizukami, T. Miyazaki, E. Ikenaga and C. Felser: “Stoichiometry Dependent Phase Transition in Mn-Co-Ga-based Thin Films: From Cubic in-plane, Soft Magnetized to Tetragonal Perpendicular, Hard Magnetized” *Applied Physics Letters* **101** (2012) 242406.

[2] SPring-8 publication ID = 24784

R. Shan, S. Ouardi, G. H. Fecher, L. Gao, A. Kellock, K. P. Roche, M. G. Samant, C. E. Vidal Barbosa, E. Ikenaga, C. Felser and S. S. Parkin: “Electronic and crystalline structures of zero band-gap LuPdBi thin films grown epitaxially on MgO(100)” *Applied Physics Letters* **102** (2013) 172401.

[3] SPring-8 publication ID = 25119

C. E. Viol Barbosa, S. Ouardi, G. H. Fecher, D. Ebke and C. Felser: "Magnetic dichroism in angular resolved hard X-ray photoelectron spectroscopy from buried magnetic layers" *Journal of Electron Spectroscopy and Related Phenomena* **189** (2013) 146-151.