2009B 期 採択長期利用課題の事後評価について - 2 -

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2009B 期に採択された長期利用課題について、2012A 期に3年間の実施期間が終了したことを受け、第44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3月）による事後評価が行われました。

事後評価は、長期利用分科会が実験責任者に対しヒアリングを行った後、評価を行うという形式で実施し、SPring-8利用研究課題審査委員会で評価結果を取りまとめました。以下に対象となる長期利用課題5課題のうち、今回評価を受けた1課題の評価結果を示します。研究内容については本誌214ページの「最近の研究から」に実験責任者による紹介記事を掲載しています。

なお、2009B 期に採択された長期利用課題5課題のうち1課題については、「SPring-8利用者情報」Vol.18 No.1（2013年2月号）の38ページに掲載済みです。残りの3課題については、平成25年7月に事後評価を実施する予定です。

課題名	XMCD study of capped ZnO nano-particles: The quest of the origin of magnetism
実験責任者(所属)	Jesus Chaboy (CSIC- Universidad de Zaragoza)
採択時課題番号	2009B0024
ビームライン	BL39XU
利用期間/配分総シフト	2009B ～ 2012A/150 シフト

〔評価結果〕

Based on the results of previous XMCD experiments they have done at the SPring-8, Prof. Chaboy and his co-workers proposed above titled long-term experiment to elucidate the origin of the ferromagnetic aspects of ZnO nano-particles. Throughout the long-term study they have concentrated to measure and to analyze Zn K-edge XMCD spectra of ZnO nano-particle capped with organic molecules. They have observed the ferromagnetic behavior of ZnO nano-particle and found that it is originated from the electronic structure at the interface between ZnO and organic molecules. The observations clarify the controversy in the discussion by means of XAS spectra. The results are appeared as a few publications and also presented at international conferences.

Though the main aim of the long-term experiment was fulfilled, the study was based on restricted methods, i.e. XMCD measurements of capped ZnO carried out by a normal experimental procedure, and the results of the study are not quite sufficient to show a new direction of multi-functional materials, as it was intended implicitly in the proposal. The study did not show a relationship to the development of experimental technique in the SPring-8.

The committee is convinced that the achievement of the present work is a moderate one.

〔成果リスト〕

（査読有）

［1］ SPring-8 publication ID = 17401
J. Chaboy, R. Boada, C. Piquer, M. A. Laguna-Marco, N. Carmona, J. Llopis, M. García-Hernández, M. L. Ruíz-González, J. González-Calbet, J. F. Fernández and M. A. García: “Evidence of intrinsic magnetism in capped ZnO nanoparticles.” *Physical Review B* **82** (2010) 064411.

［2］ SPring-8 publication ID = 17890
C. Guglieri and J. Chaboy: “Characterization of the ZnO-ZnS interface in THIOL-capped ZnO nanoparticles exhibiting anomalous magnetic properties” *The Journal of Physical Chemistry C* **114** (2010) 19629–19634.

［3］ SPring-8 publication ID = 18856
C. Guglieri and J. Chaboy: “XAS characterization of the interface in capped ZnO nanoparticles”

Diamond Light Source Proceedings **1** (2011) e143: 1-4.

[4] SPring-8 publication ID = 22956
C. Guglieri, E. Céspedes, C. Prieto and J. Chaboy: "X-ray absorption study of the local order around Mn in Mn:ZnO thin films: the role of vacancies and structural distortions." *Journal of Physics: Condensed Matter* **23** (2011) 206006.

[5] SPring-8 publication ID = 21189
E. Céspedes, M. A. Laguna-Marco, A. de Andrés, C. Prieto, F. Jiménez-Villacorta, J. Chaboy, R. Boada and C. Guglieri: "On the origin of the magnetism of Mn-Zn-O systems: structural, electronic and magnetic study of exotic MnO2-δ/ZnO films." *The Journal of Physical Chemistry C* **115** (2011) 24092–24101.

[6] SPring-8 publication ID = 21186
C. Guglieri, M. A. Laguna-Marco, M. A. García, N. Carmona, E. Céspedes, M. García-Hernández, A. Espinosa and J. Chaboy: "XMCD proof of ferromagnetic behaviour in ZnO nanoparticles" *The Journal of Physical Chemistry C* **116** (2012) 6608–6614.