

## Symposium 14:

### Advanced structure analysis and characterization of ceramic materials

Recent developments in structure analysis and characterization of inorganic crystalline and amorphous materials, such as X-ray, neutron, synchrotron, and electron diffraction, x-ray/neutron scattering, IR/Raman scattering, NMR, XAFS, pdf, first-principles calculations, computer simulations, Rietveld analysis, maximum-entropy method, in situ measurements at high temperatures/pressures and electron/nuclear density analysis are remarkable. These techniques enable one to study not only static and long-range periodic structures but also dynamic and short-/intermediate-range structures. Knowledge of the crystal and electronic structures is quite important in the exploration of novel materials. Multi-scale characterization from electron level to micrometers is becoming more important to understand the phenomena at the interface, grain boundaries and surfaces of ceramic materials. In this symposium, we discuss the structure-property relationship of various ceramic materials (Electro, Magnetic and Optical Ceramics; Energy and Environment Related Ceramics; Bio-ceramics; Ceramics for Safety and National Security Secure Society; Traditional Ceramics). Material design based on the crystal and electronic structures is also important topic in this session.

#### <PROPOSED SESSION TOPICS>

X-ray, neutron, synchrotron and electron diffraction, XAFS, PDF analysis, light scattering, computer simulation, first-principles calculations, physico-chemical properties, structure-property relationships, crystal structure, glasses and amorphous materials, nano-structure, micro-structure, interfaces, surfaces and grain boundaries. Structure-based material design. New material exploration and structure determination.

#### <CALL FOR STUDENT/YOUNG SCIENTIST AWARDS>

Describe the following information in “Request to organizer” of the web page “Oral/Poster presentation - Input” of “Abstract Submission” when you submit the abstract.

Month/year of birth of the applicant must be April 1, 1986 or the date after April 1, 1986. The applicant must be the first author of the present poster/oral presentation.

Example:

- 1) Application: I apply the award.
- 2) Applicant name: Masatomo Yashima
- 3) Position: 2nd year PhD course student, 2nd year master course student, Research Associate, Assistant Professor, Researcher etc.
- 4) Month/Year of birth: August 1989
- 5) Main three publications. Give \* to the applicant name.
  1. Yashima, M.\* (2015). Invited Review: Some recent developments in the atomic-scale characterization of structural and transport properties of ceria-based catalysts and ionic conductors. *Catalysis Today*, 253, 3-19.
  2. Zhang, W., Shiraiwa, M., Wang, N., Ma, T., Fujii, K., Niwa, E., & Yashima, M.\* (2018). Pr/Ba cation-disordered perovskite  $\text{Pr}_{2/3}\text{Ba}_{1/3}\text{CoO}_{3-\delta}$  as a new bifunctional electrocatalyst for oxygen reduction and oxygen evolution reactions. *Journal of the Ceramic Society of Japan*, 126(10), 814-819.
  3. Uno, W., Fujii, K., Niwa, E., Torii, S., Miao, P., Kamiyama, T., & Yashima, M.\* (2018). Experimental visualization of oxide-ion diffusion paths in pyrochlore-type  $\text{Yb}_2\text{Ti}_2\text{O}_7$ . *Journal of the Ceramic Society of Japan*, 126(5), 341-345.

#### <ORGANIZERS>

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Scott T. Misture, Alfred University, USA

#### <INVITED LECTURES>

Tentative invited lecture information is posted in the following URL;  
[http://www.ceramic.or.jp/pacrim13/list\\_of\\_invited\\_speakers.html#14](http://www.ceramic.or.jp/pacrim13/list_of_invited_speakers.html#14)