

# Logic and strategy for the kinetic analysis of complex solid-state reactions

**N. Koga<sup>a,\*</sup>, L.A. Perez-Maqueda<sup>b</sup>, L. Favergeon<sup>c</sup>, N.V. Muravyev<sup>d</sup>, S. Yamada<sup>e</sup>**

<sup>a</sup>Graduate School of Education, Hiroshima University, Higashi-Hiroshima, 739-8524 Japan

<sup>b</sup>Institute of Materials Science, C.S.I.C.-University of Sevilla, 41 092 Sevilla, Spain

<sup>c</sup>Mines Saint-Etienne, CNRS LGF UMR 5307, Centre SPIN, F-42023 Saint-Etienne, France

<sup>d</sup>Semenov Institute of Chemical Physics, Russian Academy of Sciences, 119991 Moscow, Russia

<sup>e</sup>Department of Applied Chemistry, National Defense Academy of Japan, Yokosuka 239-8686, Japan

\* nkoga@hiroshima-u.ac.jp, Tel.: +81-82-424-7092; Fax: +81-82-424-7092

Kinetic description of the complex solid-state reactions is a challenging task, because of the overall process comprising different heterogeneous reaction steps occurring consecutively or concurrently. For extending basic kinetic theory and the kinetic calculation methods using thermoanalytical data established for the single-step reaction to be applicable to the complex solid-state reactions, detailed case studies for the selected reaction processes with different physico-chemical and physico-geometrical complexities are necessary. In this presentation, the cutting-edge of the kinetic analysis for the complex solid-state reactions are briefly reviewed and the strategy for contributing toward the provision of theoretical foundation of the kinetic analysis for the complex solid-state reactions are discussed with a special attention to the role of the kinetic deconvolution analysis.