Phase Transitions of Alluminosilicate Refractories by Temperature Resolved XRD

Laura E. Depero[a], Donatella Garipoli[a], Paolo Bergese[a], Elza Bontempi[a], Marco Minicucci[b], Andrea Di Cicco[b], [a]*Department of Mechanical Engineering, University of Brescia.* [b]*Istituto Nazionale di Fisica della Materia, INFN-LNF and Dipartimento di Fisica, Università di Camerino, Italy.* E-mail: donatella.garipoli@ing.unibs.it

Aluminium-ceramic composites which grow in melting and holding furnaces at the interface between liquid aluminum and alluminosilicate refractories are of great technological impact. These materials cause serious problems to aluminum alloys production management, since they damage the refractory material and in turn the furnace.

However, in the literature very few papers have faced a systematic study of chemical composition, structure and microstructure of aluminium-ceramic composites [1], [2]. This is a compulsory step to understand the physico-chemical phenomena which generate the composites and then to asses innovative procedures to avoid them.

We began to investigate formation of aluminum-ceramic composites by temperature resolved X-ray diffraction (XRD). The XRD probe was exploited for tracking the composite structure during its formation upon heating in a proper furnace for high-temperature experiments based on a previous model [3] and adapted on an horizontal Bragg-Brentano goniometer. In our contribution the preliminary results of the study will be presented and discussed.

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