Contribution ID: **112** Type: **Posters**

Time-resolved kinetics ordering of FeAl

Tuesday, 16 June 2015 17:40 (1h 50m)

In this study, time resolved X-ray scattering using a synchrotron X-ray source has been used to gain insight of time-temperature atomic ordering of an intermetallic Fe40Al ball-milled powder with the aim to estrapolate these results as an explanation of rapid ordering processes occurring during thermal spray coating deposition. Interestingly, present results show that in the range between 400 to 650ºC, the evolution of the atomic order with time can be observed through the processing and fitting of the first acquired diffractograms, while above such temperatures, the ordering process is too fast to be able to be resolved with the available time resolution. Specifically, after performing Rietveld analysis of the data to fit the occupation factors of the Fe and Al atoms within the B2 lattice, it has been observed that at low temperatures such factor for the Fe changes slowly with the time and faster at higher temperatures as expected; the evolution seems to be non-exponential at moderate temperatures. The changes on the crystal lattice parameter upon heating and cooling, and its time dependence in the up-quench to moderate temperatures have been also investigated.

References

W. Pfeiler, Ordering Phenomena in Alloys: Access to Kinetic Parameters and Atom-Jump Processes, JOM-J. Met. 52:7 (2000) 14-18.
W. Pfeiler, B. Sprusil, Atomic ordering in alloys: stable states and kinetics, Mater. Sci. Eng. A324 (2002) 34–42.
J. M. Guilemany, N. Cinca, Ll. Casas, E. Molins, Ordering and disordering processes in MA and MM intermetallic iron aluminide powders, J. Mater. Sci. 44 (2009) 2152-2161.
R. F. Shannon, S. E. Nagler, C. R. Harkless, Time-resolved x-ray-scattering study of ordering kinetics in bulk single-crystal Cu3Au, Phys. Rev. B 46:1 (1992) 40-54.
JA Ctjsidó, A. Isalgué, A simple generalized model for the kinetics of crystallization in metallic glasses, Phys. Stat. Sol. 90(1985) 127-133.

Primary authors: Prof. ISALGUÉ, Antoni (Dept. Física Aplicada, Universitat Politècnica de Catalunya (UPC), Jordi Girona 1-3, 08034 Barcelona, Spain); Dr CINCA, Núria (Centre de Projecció Tèrmica (CPT). Universitat de Barcelona. Martí i Franques 1, E-08028, Barcelona.)

Co-authors: Dr CONCUSTELL, Amadeu (Centre de Projecció Tèrmica (CPT). Universitat de Barcelona. Martí i Franques 1, E-08028, Barcelona.); Dr AUGUET, Carlota (Dept. Física Aplicada, Universitat Politècnica de Catalunya (UPC), Jordi Girona 1-3, 08034 Barcelona, Spain); Dr GARCIA-CANO, Irene (Centre de Projecció Tèrmica (CPT). Universitat de Barcelona. Martí i Franques 1, E-08028, Barcelona.); Prof. GUILEMANY, Josep Maria (Centre de Projecció Tèrmica (CPT). Universitat de Barcelona. Martí i Franques 1, E-08028, Barcelona.)

Presenter: Dr CINCA, Núria (Centre de Projecció Tèrmica (CPT). Universitat de Barcelona. Martí i Franques 1, E-08028, Barcelona.)

Session Classification: Special Session - Coffee and poster discussion: ALBA users and AUSE members

Track Classification: VII AUSE Congress