

MM 19: HV Beke

Time: Tuesday 14:00–14:30

Location: IFW A

Invited Talk

MM 19.1 Tue 14:00 IFW A

Diffusion, interface shifts and solid state reactions in nanoscale — ●DEZSO L. BEKE, ZOLTAN ERDÉLYI, ZOLTAN BALOGH, CSABA CSERHÁTI, GABOR A. LANGER, and GABOR L. KATONA — Department of Solid State Physics, University of Debrecen, 4032 Debrecen, P.O.Box 2., Hungary

In a set of recent papers we have shown that the diffusion asymmetry in diffusion couples (the diffusion coefficient is orders of magnitude larger in one of the parent materials) leads to interesting phenomena: i) Sharp interface remains sharp and shifts with non Fickian (anomalous) kinetics [1-3], ii) originally diffuse interface sharpens even in ideal (completely miscible) systems [4,5], iii) there exists a crossover thickness above which the interface shift turns back to the Fickian behaviour [6], iv) the growth rate of a product of solid state reaction can be linear even if there is no any extra potential barrier present (which is the classical interpretation of the "interface reaction control" for linear kinetics). Further results on the growth kinetics of an initially existing thin AB phase in the A/AB/B diffusion couple as well as on the size of the critical nucleus in the "nucleation and growth" mode will also be presented [7,8].

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[1] Z. Erdélyi et al., Surf. Sci. 496,129(2002)

[2] G.L. Katona et al., Phys. Rev. B71, 115432(2004)

[3] Z. Balogh et al., Appl. Phys. Lett. 92,143104(2008)

[4] Z. Erdélyi et al. Phys. Rev. Lett. 89,165901(2002)

[5] Z. Erdélyi et al., Science, 306,1913 2004

[6] D.L. Beke, Z. Erdélyi: Phys. Rev. B73,035426(2006)

[7] C. Cserhati et al., J of Appl.Phys. 104,1(2008)

[8] Z. Erdélyi, et al., submitted to Phys. Rev. Letters.