TRACER DIFFUSION MECHANISM IN AMORPHOUS CO-BASED ALLOYS

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TÓM TẮT:

Tracer diffusion in amorphous solid is studied through the bubble statistic. The bubble is defined as a group of atoms around a spherical void and large bubble represents a structural defect which could be eliminated under thermal annealing. It was found that amorphous alloys such as CoxB100-x and Fe80P20 suffer from a large number of vacancy-bubbles which function like diffusion vehicle. The concentration of vacancy-bubble weakly depends on the temperature, but essentially on the relaxation degree of considered sample. The diffusion coefficient estimated for diffusion mechanism via vacancy-bubbles is in reasonable agreement with experiment for actual amorphous alloys. The relaxation effect for tracer diffusion in amorphous alloys is interpreted by the decrease in vacancy-bubble concentration under thermal annealing.