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Modelling the evaporation of aluminum in Ti–6Al–4V alloy melted with electron beam and laser

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ABSTRACT

Aluminum evaporating behavior is investigated by thermokinetic simulation in Ti–6Al–4V alloy melted with electron beam and laser. The model in this paper is based on molecular collision and diffusion, which is different from the Langmuir equation and can describe the evaporation with residual pressure ranges from high vacuum to atmosphere. Calculation of diffusion coefficient proves the presence of critical pressure. Below the critical pressure, gasification is the dominant stage for evaporation, whereas diffusion is the dominant stage above the critical pressure. The model describes well the experimental results.

KEYWORDS: aluminum, evaporation, diffusion, electron beam, laser