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A molecular dynamics study of activated tungsten inert gas welding process

Cheng Jin, Dalian Jiaotong University; Hanchen Huang, Northeastern University

ABSTRACT

In the present work, the mechanism of the activated tungsten inert gas (A-TIG) welding is studied by using molecular dynamics method. The effect of flux molecules on the flow and geometry of weld pool is analyzed by atoms trajectories and thermal properties calculations. It shows that the flux, especially some oxidizes, can change the temperature dependence of surface tension grads from a negative value to a positive value. The fluid flow will be inward along the surface of the weld pool toward the center and then down to the pool bottom and produces a relatively deep and narrow weld. By molecular dynamics calculations, some common characteristics of the activating flux in A-TIG welding are also proposed which are helpful to choose or design a suitable flux.