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Parametric mapping of linear deposition morphology in uniform metal droplet deposition technique

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Abstract

The parametric mapping of linear deposition morphology with different droplet spacing is first proposed, which provides a baseline for parameter selection in uniform metal droplet deposition technique. Experiments related to linear deposition are carried out with deviating droplet size and deposition placement. Deposition morphology is first categorized into inclined region, wave-shaped region and horizontal region. Horizontal region is further classified into overlapped sub-region, clustered sub-region and discrete sub-region. Mathematical models about classification of deposition morphology are established by these initial parameters: offset ratio, merge ratio, solidification angle, and maximum spreading diameter. After mathematical models are established, boundaries between regions are extracted, and then verified by CCD (Charge-coupled Device) photographs and experimental data. Based on the above models and experiment results, the parametric mapping is found