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# Energy-based approach for fatigue life prediction of pure copper

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**Abstract:**

This paper focuses on the study of a new energy-based approach for fatigue life prediction of pure copper based on thermographic measurement. The proposed method demonstrates two major improvements. The first improvement is the introduction of a new fatigue indicator by using the intrinsic dissipation instead of the apparent temperature. And the second concerns the improvement of the law of damage accumulation by explicitly considering the damage evolution during the fatigue process. Based on such principles, two different lifetime prediction models are developed. Experimental verification is performed through the fatigue tests on the pure polycrystalline copper. Satisfactory predictions are achieved by comparing to the conventional fatigue testing protocol.

**Keywords:**

Fatigue; Life prediction; *S-N* curve; Thermographic method; Energy dissipation

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