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Tension-tension fatigue behaviours of notched freestanding pure Ti foils with different thicknesses

Meiqi Yao, Hongyang Wang, Yi Zhao, Jiangbo Sha

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## **ACCEPTED MANUSCRIPT**

#### Tension-tension fatigue behaviours of notched freestanding pure Ti

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Meiqi Yao, Hongyang Wang, Yi Zhao, Jiangbo Sha\*

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Corresponding author, Jiangbo Sha

School of Materials Science and Engineering, Beihang University

Xueyuan Road No.37, Haidian District, Beijing, 100083, China

Email: jbsha@sina.com, jbsha@buaa.edu.cn

Tel. 86-010-82315989

Fax: 86-010-82338200

**Abstract:** This work addresses the mode I fatigue crack propagation behaviours of pure Ti foils using freestanding notched rectangular specimens under tension-tension cyclic loading. Compared to the 50-µm-thick foil, the 30-µm-thick foil exhibited a higher yield strength ( $\sigma_y$ ) but a lower fracture toughness ( $K_Q$ ) and fatigue life ( $N_f$ ) for the same loading conditions. The Paris constant *m* decreased from 5.12 to 4.45, when the foil thickness increased from 30 µm to 50 µm. The incomplete self-similarity parameter *Z* at the crack tip was found to be higher in the 30-µm-thick foils, resulting in a higher Paris constant *m* than that in the 50-µm-thick foils.

Keywords: Titanium alloys; Tensile loading; Fatigue crack growth; Effective stress intensity factor; Failure analysis.

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