Institute of Chemical Engineering

Fractal dimension for bending–torsion fatigue fracture characterisation

Publication date:	01.11.2021
Publication title:	Fractal dimension for bending–torsion fatigue fracture characterisation
Authors:	Mateusz Korpyś, et al.
Journal information:	Measurement

Fracture surfaces after biaxial fatigue tests were compared using fractal dimension for three types of metallic materials in smooth and notched specimens made of S355J2 and 10HNAP steels and 2017-T4 aluminium alloy, considering both proportional and nonproportional cyclic loading. High-resolution optical 3D measurement studies were performed on the entire fracture surface. A direct correlation between fractal dimension and fatigue loading was established. This systematic relationship can serve as a basis for obtaining information about fatigue loading from the fracture surfaces of failed materials and structures. Moreover, measurements of the fracture surface with an optical profilometer, quantitative analysis, and fractography contribute to a better comprehension of the fatigue failure processes. Differences in individual zones of fatigue fractures were identified while demonstrating the correctness of the total fracture surface method.

Metryczka

Published by:	Marek Tańczyk
Published at:	08.05.2026 15:16
Number of views:	3