1. Record Nr. UNINA9910346774603321

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Titolo	Experimental Investigation of Crack Initiation in Face-Centered Cubic Materials in the High and Very High Cycle Fatigue Regime
Pubbl/distr/stampa	KIT Scientific Publishing, 2016
ISBN	1000051515
Descrizione fisica	1 online resource (XXX, 185 p. p.)
Collana	Schriftenreihe des Instituts für Angewandte Materialien, Karlsruher Institut für Technologie
Soggetti	Technology: general issues
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Sommario/riassunto	This book investigates the fatigue mechanisms and crack initiation of Ni, Al and Cu on a small-scale in the Very High Cycle Fatigue regime by means of innovative fatigue experimentation. A novel custom-built resonant fatigue setup showed that the sample resonant frequency changes with increasing cycle number due to fatigue damage. Mechanisms such as slip band formation have been observed. Cyclic hardening, vacancy and oxidation formation may be considered as early fatigue mechanisms.