

1. Record Nr.	UNINA9910830341903321
Autore	Takadoum Jamal
Titolo	Materials and surface engineering in tribology [[electronic resource] /] / Jamal Takadoum ; translated from the French by Veronique Beguin
Pubbl/distr/stampa	London, : ISTE Hoboken, NJ, : John Wiley & Sons, 2008
ISBN	1-282-16532-1 9786612165320 0-470-61152-9 0-470-39417-X
Descrizione fisica	1 online resource (242 p.)
Collana	ISTE ; ; v.69
Altri autori (Persone)	TakadoumJamal
Disciplina	621.8/9 621.89
Soggetti	Tribology Surfaces (Technology) Mechanical wear
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Materials and Surface Engineering in Tribology; Table of Contents; Foreword; Preface; Chapter 1. Surfaces; 1.1. Introduction; 1.2. The surface state; 1.2.1. Structural state of a surface; 1.2.2. Topographic state of a surface; 1.2.2.1. Atomic-scale topographic state; 1.2.2.2. Micrometer-scale topographic state; 1.2.2.3. Experimental techniques; 1.2.3. Surface energy; 1.2.3.1 Surface energy measurements; 1.2.4. Mechanical state of a surface; 1.2.4.1. Hardness; 1.2.4.2. Young's modulus; 1.2.4.3. Nano-indentation; 1.2.4.4. Fracture toughness; 1.2.4.5. Residual stresses 1.2.5. Chemical composition of a surface 1.2.5.1. Energy dispersive X-ray analysis; 1.2.5.2. X-ray photoelectron spectroscopy; 1.2.5.3. Auger electron spectroscopy; 1.2.5.4. Glow discharge optical emission spectroscopy; 1.2.5.5. Rutherford backscattering spectroscopy; 1.2.5.6. Secondary ion mass spectroscopy; 1.2.5.7. Infrared spectrometry; Chapter 2. Tribology; 2.1. Introduction; 2.2. Elements of solid mechanics; 2.2.1. The stress vector; 2.2.2. The stress tensor; 2.2.3.

Yield criteria; 2.2.3.1. The Tresca criterion; 2.2.3.2. The von Mises criterion; 2.3. Elements of contact mechanics
2.3.1. Hertz contact theory; 2.3.2. The contact area; 2.3.3. Plastification of asperities; 2.3.4. Adhesive contact; 2.4. Friction; 2.4.1. The coefficient of friction; 2.4.2. Tribometers; 2.4.3. Laws and theories of friction; 2.5. Nanotribology; 2.5.1. Surface forces; 2.5.1.1. Electrostatic forces; 2.5.1.2. Capillary forces; 2.5.1.3. Van der Waals forces; 2.5.2. Surface forces measurements; 2.5.2.1. The surface forces apparatus (SFA); 2.5.2.2. The atomic force microscope (AFM); 2.5.2.3. Application: surface forces and micromanipulation; 2.5.3. Nanofriction; 2.6. Wear
2.6.1. The different forms of wear; 2.6.1.1. Adhesive wear; 2.6.1.2. Abrasive wear; 2.6.1.3. Fatigue wear; 2.6.1.4. Tribochemical wear; 2.6.2. Wear maps; 2.6.3. Interface tribology: third body concept; 2.6.4. The PV product; 2.7. Lubrication; 2.7.1. Oils; 2.7.1.1. The notion of viscosity; 2.7.1.2. The viscosity index and the SAE standard; 2.7.1.3. The Stribeck curve; 2.7.1.4. The different types of oils; 2.7.1.5. Greases; 2.7.1.6. Anti-friction materials; 2.8. Wear-corrosion: tribocorrosion and erosion-corrosion; 2.8.1. Tribocorrosion; 2.8.2. Erosion-corrosion
Chapter 3. Materials for Tribology
3.1. Introduction; 3.2. Bulk materials; 3.2.1. Metallic materials; 3.2.1.1. Iron-based alloys; 3.2.1.2. Superalloys; 3.2.1.3. Copper-based alloys; 3.2.2. Polymers; 3.2.2.1. High-density polyethylene; 3.2.2.2. Fluorinated polymers; 3.2.2.3. Polyacetal (polyoxymethylene: POM) and polyamide; 3.2.2.4. Polyimide; 3.2.2.5. Polyetheretherketone (PEEK); 3.2.2.6. Friction and wear of polymers; 3.2.2.7. Surface treatment of polymers; 3.2.3. Composites; 3.2.3.1. Friction materials; 3.2.4. Ceramics; 3.2.4.1. Friction and wear of ceramics; 3.2.5. Cermets
3.2.5.1. Tungsten-carbide (WC)-based cermets

Sommario/riassunto

This title is designed to provide a clear and comprehensive overview of tribology. The book introduces the notion of a surface in tribology where a solid surface is described from topographical, structural, mechanical, and energetic perspectives. It also describes the principal techniques used to characterize and analyze surfaces. The title then discusses what may be called the fundamentals of tribology by introducing and describing the concepts of adhesion, friction, wear, and lubrication. The book focuses on the materials used in tribology, introducing the major classes of materials used, ei
