Contents

Foreword ................................................................. v
Acknowledgments ..................................................... vii
Contributors .......................................................... xiii

Diamond-like Carbon Films: A Historical Overview ................. 1
C. Donnet and A. Erdemir

Section A: General Overview on DLC Coatings

1 Classification of Diamond-like Carbons ......................... 13
   J. Robertson

2 Non-destructive Characterisation of Carbon Films ............ 25
   A. C. Ferrari

3 Mechanical Characterisation and Properties of DLC Films .... 83
   P. Lemoine, J. P. Quinn, P. D. Maguire and J. A. McLaughlin

4 Residual Stresses in DLC Films and Adhesion to Various Substrates 102
   Y. Pauleau

Section B: Tribology of DLC Coatings Fundamentals and Experimental Studies

5 Fundamentals of the Tribology of DLC Coatings ............ 139
   J. Fontaine, C. Donnet and A. Erdemir

6 Environmental and Thermal Effects on the Tribological Performance of DLC Coatings 155
   H. Ronkainen and K. Holmberg

ix
7 Third Bodies and Tribochemistry of DLC Coatings .......................... 201
   T. W. Scharf and I. L. Singer

8 An Overview of Superlubricity in Diamond-like Carbon Films ........ 237
   A. Erdemir, J. Fontaine and C. Donnet

9 Hard DLC Growth and Inclusion in Nanostructured Wear-protective Coatings ................................................. 263
   A. A. Voevodin

10 Environmental and Surface Chemical Effects on Tribological Properties of Carbon-based Coatings ...................... 282
    F. M. Borodich, Y. -W. Chung and L. M. Keer

11 Triboemission and Triboplasma Generation with DLC Films ........... 291
    K. Nakayama

12 Doping and Alloying Effects on DLC Coatings .......................... 311
    J. C. Sánchez-López and A. Fernández

13 Tribology of Carbon Nitride Coatings ................................... 339
    K. Adachi and K. Kato

14 Tribology of DLC Films Under Fretting Conditions .................... 362
    R. Wäsche and D. Klaffke

15 Tribology of DLC Films Under Slip-Rolling Conditions ................. 383
    C. Manier, D. Spaltmann and M. Woydt

16 Tribological Behavior of DLC Films in Various Lubrication Regimes ................................................................. 410
    B. Podgornik

Section C: Applications and Future Trends in DLC’s Tribology

17 Industrial Production of DLC Coatings .................................... 457
    H. G. Fuß and M. Frank

18 DLC Films in Mechanical and Manufacturing Industry .................. 469
    C. Héau

19 Wear Resistance of Amorphous DLC and Metal Containing DLC in Industrial Applications ....................................... 484
    G. J. van der Kolk
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>DLC Films in Biomedical Applications</td>
<td>494</td>
</tr>
<tr>
<td></td>
<td>R. Hauert</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Nanotribology of Ultrathin and Hard Amorphous Carbon Films</td>
<td>510</td>
</tr>
<tr>
<td></td>
<td>B. Bhushan</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Laser Processing of Tribological DLC Films: An Overview</td>
<td>571</td>
</tr>
<tr>
<td></td>
<td>G. Dumitru</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>New Trends in Boundary Lubrication of DLC Coatings</td>
<td>591</td>
</tr>
<tr>
<td></td>
<td>M. I. De Barros Bouchet and J. M. Martin</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Fullerene-like Carbon Nitride: A New Carbon-based Tribological Coating</td>
<td>620</td>
</tr>
<tr>
<td></td>
<td>E. Broitman, J. Neidhardt and L. Hultman</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Index</td>
<td>655</td>
</tr>
</tbody>
</table>
Tribology of Diamond-like Carbon Films
Fundamentals and Applications
Donnet, C.; Erdemir, A. (Eds.)
2008, XVI, 664 p., Hardcover