
ADHESION MEASUREMENT OF FILMS AND COATINGS

Editor: K.L. Mittal

///VSP///

Utrecht, The Netherlands, 1995

Contents

Preface	ix
Adhesion measurement of films and coatings: a commentary <i>K. L. Mittal</i>	1
Adherence failure and measurement: some troubling questions <i>S. D. Brown</i>	15
Measurement of adhesion for thermally sprayed materials <i>C. C. Berndt and C. K. Lin</i>	41
Adhesion measurement of thin metal films by scratch, peel, and pull methods <i>A. Kinbara and I. Kondo</i>	71
Fracture mechanics tests for measuring the adhesion of magnetron-sputtered TiN coatings <i>D. Müller, Y. R. Cho, S. Berg and E. Fromm</i>	87
The effect of residual stresses on adhesion measurements <i>M. D. Thouless and H. M. Jensen</i>	95
Adhesion of diamond-like carbon films on polymers: an assessment of the validity of the scratch test technique applied to flexible substrates <i>B. Ollivier and A. Matthews</i>	103
Adhesion improvement of RF-sputtered alumina coatings as determined by the scratch test <i>F. Ramos and M. T. Vieira</i>	115
Scratch indentation, a simple adhesion test method for thin films on polymeric supports <i>G. D. Vaughn, B. G. Frushour and W. C. Dale</i>	127
On the evaluation of adhesion of coatings by automatic scratch testing <i>T. Z. Kattamis</i>	143

Continuous microscratch measurements of thin film adhesion strengths <i>S. K. Venkataraman, J. C. Nelson, A. J. Hsieh, D. L. Kohlstedt and W. W. Gerberich</i>	161
Micro-scratch test for adhesion evaluation of thin films <i>V. K. Sarin</i>	175
Mechanics of the indentation test and its use to assess the adhesion of polymeric coatings <i>R. Jayachandran, M. C. Boyce and A. S. Argon</i>	189
Observations and simple fracture mechanics analysis of indentation fracture delamination of TiN films on silicon <i>E. R. Weppelmann, X.-Z. Hu and M. V. Swain</i>	217
A study of the fracture efficiency parameter of blister tests for films and coatings <i>Y.-H. Lai and D. A. Dillard</i>	231
Adhesion (fracture energy) of electropolymerized poly(<i>n</i> -octyl maleimide-co-styrene) coatings on copper substrates using a constrained blister test <i>J.-L. Liang, J. P. Bell and A. Mehta</i>	249
An experimental partitioning of the mechanical energy expended during peel testing <i>R. J. Farris and J. L. Goldfarb</i>	265
Comparison of finite element stress analysis results with peel strength at the copper–polyimide interface <i>R. H. Lacombe, L. P. Buchwalter and K. Holloway</i>	283
Measurement of the practical adhesion of paint coatings to metallic sheets by the pull-off and three-point flexure tests <i>A. A. Roche, P. Dole and M. Bouzziri</i>	299
Analysis of pull tests for determining the effects of ion implantation on the adhesion of iron films to sapphire substrates <i>J. E. Pawel and C. J. McHargue</i>	323
Measurement of the adhesion of diamond films on tungsten and correlations with processing parameters <i>M. Alam, D. E. Peebles and J. A. Ohlhausen</i>	331

Adhesion measurement of non-crystalline diamond films prepared by a laser plasma discharge source <i>F. Davanloo, T. J. Lee, H. Park, J. H. You and C. B. Collins</i>	345
Nondestructive dynamic evaluation of thin NiTi film adhesion <i>Q. Su, S. Z. Hua and M. Wuttig</i>	357
Recent developments in the laser spallation technique to measure the interface strength and its relationship to interface toughness with applications to metal/ceramic, ceramic/ceramic and ceramic/polymer interfaces <i>V. Gupta, J. Yuan and A. Pronin</i>	367
Assessment of adhesion of Ti(Y)N and Ti(La)N coatings by an <i>in situ</i> SEM constant-rate tensile test <i>Z. Yu, C. Liu, Li Yu and Z. Jin</i>	403
Adhesion studies of polyimide films using a surface acoustic wave sensor <i>D. W. Galipeau, J. F. Vetelino and C. Feger</i>	411
Salt bath test for assessing the adhesion of silver to poly(ethylene terephthalate) web <i>J. M. Grace, V. Botticelli, D. R. Freeman, W. Kosel and R. G. Spahn</i>	423
Testing the adhesion of paint films to metals by swelling in <i>N</i> -methyl pyrrolidone <i>W. J. van Ooij, R. A. Edwards, A. Sabata and J. Zappia</i>	435