



Adhesion Science: Recent Developments and Prospects

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The phenomenon of adhesion is of crucial importance in many nanotechnology areas (e.g., MEMS/NEMS devices, microfluidics, Lab-on-paper devices, nanoprinting, nanoimprint lithography, nano biodevices, nanocleaning, and nanocomposites). So the importance of understanding of mechanisms of adhesion and devising ways to control it is quite patent. The subject of adhesion is veritably inter-, multi- and transdisciplinary; and for a holistic approach to adhesion, a synergistic interaction is required among the various disciplines involved, viz., surface chemistry, rheology and fracture mechanics. Even a cursory look at the literature will evince that there has been a quantum jump in our knowledge of why and how things stick together and all signals indicate that this trend will continue unabated. There have been recent exciting developments in many facets of adhesion science and a complete discussion of all these will be prohibitively long. So in this talk, the recent advances in the following areas will be discussed: acid-base interactions and their relevance to adhesion; investigation of interfacial interactions; polymer surface modification; coupling agents or adhesion promoters; and superhydrophobicity. As an epilogue, some of the unsolved problems that need intensified R&D efforts will be highlighted. As for the future of adhesion science, the prospects look very bright and the fraternity of adhesionists ("stickologists") will keep on growing at a high pace.

Dr. Kashmiri Lal Mittal received his Ph.D. degree from the University of Southern California in 1970 and was associated with the IBM Corporation from 1972 to 1993. Currently he is teaching and consulting worldwide in the broad areas of adhesion as well as surface cleaning. He has initiated, organized and chaired a large number of international symposia, and is the editor of 100 published books as well as others which are in process of publication within the broad realms of Surface and Colloid Science, and Adhesion. He has received many awards and honors, and is listed in many biographical reference works. He is a founding editor and currently Editor-in-Chief of the international Journal of Adhesion Science and Technology and is/has been a member of editorial boards of a number of scientific and technical journals. Dr. Mittal was recognized for his contributions and accomplishments by the worldwide adhesion community by organizing in his honor on his 50th birthday the 1st International Congress on Adhesion Science & Technology in Amsterdam in 1995. In 2002 he was honored by the global surfactant community by inaugurating the Kash Mittal Award in the surfactant field in his honor for his large efforts and significant contribution to the field of colloid and interface chemistry. In 2003 he was honored by the Maria Curie-Skłodowska University, Lublin, Poland by awarding him the title of doctor honoris causa.

