高分子科学系列讲座

高分子物理与化学国家重点实验室 中国科学院长春应用化学研究所

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报告时间	2013.6.24 上午 8:30	**报告地点**	主楼四楼学术报告厅（410 室）
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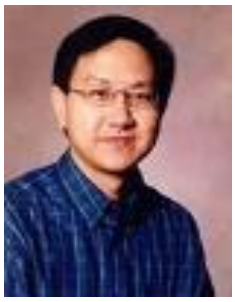
报告人背景



Dr. Wong began his graduate training in mechanics and mechanisms of fracture of polymer blends with and without glass fiber reinforcements at UMass Amherst, working with Shanti V. Nair and Lloyd A. Goettler. Later he joined the group of Yiu-Wing Mai, FRS, at University of Sydney on identifying the roles of maleated block copolymers as a sequence of events in toughening nylon polypropylene blends. He later pursued an academic career in Singapore, teaching at the School of Materials Science and Engineering in Nanyang Technological University. He received demonstrable external research funding in excess of $1.8 million as a PI, and an additional $662,000 as a co-PI. In addition to pursuing bio-inspired materials research, he has worked on mechanical behavior and functional properties of polymers, electrospinning, processing-structure-property relationships, coatings, bio- and nano-materials and composites. Dr. Wong has authored and coauthored 60 articles in book, journal and patent literatures. His work is widely cited with a Hirsh index ~ 17. One of his pioneering papers on graphite nanocomposites was cited well over a hundred times. He was awarded the competitive Australian Postdoctoral Fellowship and in 2007 he was selected as a recipient for the prestigious National Science Foundation CAREER Award.

报告题目

Polymeric Fiber Arrays for Adhesion and Contact Mechanics Phenomena

内容摘要

We examined a variety of polymeric fabrics and membranes for their adhesion strength and energy. It was found that a change in bending stiffness of fibrous structures critically influences the ability of fibers to meander through surface asperities, thus altering the adhesion energy of materials. In this study, adhesion energy of fibrous membranes was measured using a shaft loaded blister test. Fibrous membranes made of micro- and nano structures exhibit high adhesion energy in contact with a rigid cardboard substrate (206 ± 26 mJ/m^2). We tested bio-inspired dry adhesives, which are electrically insulating, and showed a shear adhesion strength ~ 27 N/cm^2 on a glass slide. This measured value is 270% that reported from gecko's foot hairs and 97-fold above normal adhesion strength of the same arrays. The data indicated a strong shear binding-on and easy normal lifting-off when the dimensions of fibers and filaments such as fiber diameter and thickness are comparable to characteristic length scales.