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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从事专业	Polymer Materials Science		
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报告时间	2013.07.23 上午 9:00	**报告地点**	主楼四楼学术报告厅（410 室）
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报告人背景 	See attached CV for Prof. To Ngai.		
报告题目	**Exploring interaction forces between solid surfaces adsorbed with polymers**		

内容摘要

Solid surfaces adsorbed with polymers can respond to variable changes including pH value and salt concentration of a surrounding aqueous solution, resulting in a very pronounced change of surface properties and wettability. Therefore, these polymer-coated surfaces have often been used to control the adsorption of various colloidal particles or biological molecules. In all the applications mentioned above, the understanding and knowledge of the interaction forces between polymer-modified surfaces in aqueous solutions of varying conditions are critical. However, the information available on the direct force measurement is scarce and conflicting.

In this talk I will show that by using the techniques of Total Internal Reflection Microscopy (TIRM), interaction forces between polymer-coated surfaces can be directly measured with a force resolution down to a few femto-Newtons (fN). I will first illustrate the inter-particle interaction in binary particle suspensions, and show that, the initial addition of charged nanoparticles can alter the interaction force between charged microparticle and plate surface. I will further show the effect of overdosed free polyelctrolytes on the interaction forces between two solid surfaces. A strong long-ranged attraction is measured and this range is too large to be compatible with van der Waals attraction. Lastly, I will show the measurement of interactions between polymer brushes grafted on a glass surface and a microparticle and investigate the influence of different electrolyte environments on the conformational behavior of surface-grafted polyelectrolyte brushes, a study which might find applications in the design of mechanosensitive polymer brushes for biosensor devices.