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Adhesion

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Adhesion is a highly practical subject in which the vast majority of published work is either chemical in nature, concerned with chemistry that is thought to occur at an adhesive junction or chemistry of adhesives, or essentially mechanical, concerned with the mechanics of testing and failure of adhesive systems. The role of polymer physics in general and de Gennes' work in particular is to discover what happens at the scale of the polymer chain and hence form a bridge between these two approaches. A distinguishing feature of Gennes' work in adhesion is the way he developed simple models that permitted us to see the essential physics of the situation. This is particularly true in his work in viscoelastic effects on toughness (the de Gennes trumpet) where more sophisticated mechanics had been done but the physical situation was obscure. Much of his work was concerned with the effects of connector molecules in toughening an interface in both elastomeric and glassy materials. This work has been extended by a number of authors and forms the basis of our current understanding of the area.