Silicone modified polyurethane durable interpenetrating network anti-fouling coating

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Abstract It is an increasingly serious problem that marine biofouling causes hull surface damage and marine biological invasion. Designing a coating with excellent wear resistance and good antifouling performance is a difficult challenge. In order to solve this problem, the use of a stain release coating with excellent wear resistance to prevent biological adhesion is an effective strategy. Polydimethylsiloxane (PDMS) has received extensive attention as a antifouling coating for ships, but its adhesion and mechanical properties are relatively insufficient. In this study, silicone modified polyaspartic polyurea was prepared by synchronous crosslinking polymerization. Polyaspartate polyurea is used to form a tight cross-linked network with excellent toughness and outstanding adhesion. Polydimethylsiloxane is used to form a softer crosslinking network with lower surface energy and surface elastic modulus. The polyurea and silicone molecular chains are locked to each other through their respective polymerization systems and crosslinking processes to form an interpenetrating polymer network (IPN). The synergistic effect between silicone and polyurea provides excellent mechanical properties and dirt release performance through a locking mechanism. It provides a promising general strategy for the development of antifouling coatings with excellent wear resistance.

Keywords: Anti-fouling, Polyaspartic ester polyurea, Wear resistance

Reference

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