# Preparation of amino pyrimidine modified polyaspartic ester polyurea coating with anti-fouling properties

**Zhenhua Zhang**[1], Haotian Wang[1], Rongrong Chen*,[1], Jing Yu[1], Jun Wang[1], Rumin Li*,[1]

[1] *Key Laboratory of Superlight Materials and Surface Technology, Ministry of Education, College of Materials Science and Chemical Engineering, Harbin Engineering University, Harbin 150001, China*

**Abstract** Marine biofouling is a difficult problem that needs to be faced in the process of developing marine resources. Currently, applying marine anti-fouling coatings is the most economical and effective way to prevent and control marine biofouling. Therefore, coupling agent modified pyrimidine (PD-560) was prepared by amino epoxide ring opening reaction using silane coupling agent KH560 and 2,4,6-triaminopyrimidine. Subsequently, pyrimidine modified polyaspartic ester polyurea (AMPU-x) was prepared by PD-560, polyether polyol, isophorone diisocyanate (IPDI) and polyaspartic ester NH1220. The introduction of pyrimidine into AMPU-x makes the coating surface rougher, while the increase in hydrophilic hydroxyl content leads to a more hydrophilic surface. In addition, adding modified pyrimidine can improve the mechanical properties of the coating, but excessive addition can affect the crystallinity inside the polymer and reduce the tensile strength of the coating. The anti-fouling performance of the coating was evaluated through anti-diatom adhesion experiments, and the introduction of pyrimidine significantly increased the anti-fouling performance of the polyurea coating. Among them, AMPU2.5 had the best performance, with an inhibition rate of 93.7% for *Halamphora sp. (Ha.)* diatom adhesion and 90.3% for *Nitzschia Chosterium (Nc.)* diatom adhesion after 7 days, indicating that the coating has excellent inhibition performance against primary fouling organisms. The pyrimidine modified polyaspartic ester urea coating with excellent anti fouling performance provides theoretical support for the development of ship protective coatings.

**Keywords:** polyaspartic ester, polyurea, coating, marine anti-fouling

## Reference

[1] Jianang Sha, Xin Liu, Rongrong Chen, Jing Yu, Qi Liu, Jingyuan Liu, Jiahui Zhu, Peili Liu, Rumin Li, Jun Wang, Surface hydrolysis-anchored eugenol self-polishing marine antifouling coating. Journal of Colloid and Interface Science. 637 (2023), 67–75.