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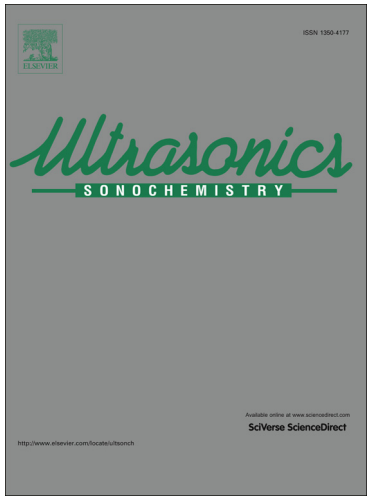


Short communication

# A new methodology to prepare ceramic-organic composite coatings with good cavitation erosion resistance

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# A new methodology to prepare ceramic-organic composite coatings with good cavitation erosion resistance

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**Abstract:** A simple, scalable and economical method was proposed to obtain ceramic-organic composite coating with excellent comprehensive properties include hardness, toughness, elastic recovery, lamellar interfacial bonding and anti-cavitation erosion: introducing epoxy resin into the pores and micro-cracks of plasma sprayed ceramic coating. The results indicate that the epoxy resin was successfully penetrated into the whole ceramic coating and filled almost all defects by vacuum impregnation, which greatly enhanced its compactness and mechanical properties. The bonding strength between top coating and metal interlayer significantly increased from 17.3 MPa to 53.0 MPa, and the hardness (*H*) of top coating greatly increased from 11.07 GPa to 23.57 GPa. Besides, the value of $H^3/E^2$ also increased from 0.06 GPa to 0.15 GPa, meaning the toughness of ceramic coating had been obviously improved. The pure ceramic coating had been punctured only after 4 h of cavitation test. However, the resin with high elasticity and toughness can effectively absorb impact energy, prevent cracks propagation and delay splats spallation during the cavitation erosion process. The novel composite coating displayed far better cavitation erosion resistance than pure ceramic coating, and it was still intact after 10 h of test.

**Keywords:** Ceramic coating; Vacuum impregnation; Mechanical properties; Cavitation erosion

## 1. Introduction

Many components of ships, hydraulic systems and aero-engine fuel systems are

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