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## Impact of silica nanoparticles on the morphology and mechanical properties of sol-gel derived coatings

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### Abstract:

Although corrosion resistance and mechanical properties of sol-gel coatings have been studied independently, there are limited studies that consider both collectively. However, since any form of mechanical damage could impair the protective function of the coating, it is prudent to consider the mechanical durability of coatings as well as their corrosion resistance. The present work considers the impact of silica nanoparticles on the morphology and mechanical properties of a sol-gel derived coating. The relationships between the results obtained from tests such as atomic force microscopy (AFM), nanoindentation or erosion test with previously reported corrosion results obtained via salt spray or electrochemical impedance spectroscopy (EIS) are discussed. Results show that reinforcing a sol-gel coating with silica nanoparticles and, particularly, functionalised silica nanoparticles led to coatings with improved mechanical properties and enhanced erosion impact resistance. The role of nanoparticles on improving mechanical properties and corrosion resistance, which is of importance within the coating industry, is discussed.

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