

## **Polyetherimide(PEI)/SiO<sub>2</sub> organic/inorganic composite: sol-gel synthesis, structural characterization, surface interactions and antibacterial activity**

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### **Abstract**

Polyetherimide (PEI), an amorphous thermoplastic material is a promising candidate for wide applications due to its high heat stability and its biocompatibility in human tissue. In the present paper, PEI (4 wt%) was added to SiO<sub>2</sub> inorganic matrix in order to obtain a novel composite biomaterial through sol-gel route. Structural characterization of the biomaterial was provided by *Fourier transform infrared spectroscopy* (FTIR) that confirmed the presence of both organic and inorganic components in the structure. A theoretical study based on Molecular Mechanics and Molecular Dynamics methods will be useful in order to better understand the intermolecular interaction at the organic/inorganic interface compared with the discussed structural characterization. Concerning the compatibility in the biological system, a study of antibacterial properties was carried out. The effect of PEI/SiO<sub>2</sub> composite on gram-negative bacterium *Escherichia coli*, was analyzed with a marked antimicrobial activity.