

Functionalization of graphene with charged surfactants and their antibacterial activity

Students:

Ameera Mohammed Mousa
Saja Mohammed Thiab
Maha Kamal Alott

Supervisor :

Dr.Mohyeddin Assali

Abstract :

Graphene is a monolayer of tightly packed carbon atoms that attracted tremendous research interest in recent years, owing to its interesting physical, chemical, electrical, mechanical and optical properties and has numerous exciting applications. Graphene was isolated for the first time by the group of Andre Geim and Konstantin Novoselov (Manchester University) in 2004.

The aim of this work was the covalent functionalization of graphene with p-nitro benzyl amine through Tour reaction followed by non-covalent functionalization with various charged surfactants (cationic-citramide, nonanionic-Tween 80, anionic-SDS) to get a highly stable conjugate in the presence of FITC to improve the solubility and antibacterial activity of this nano-derivative, and to ensure its penetration inside the bacteria. The graphene was functionalized with benzyl amine blocked with di-tert-butylidicarbonate (Boc) protecting groups that can be removed under acidic condition to further functionalization of graphene. The amine loading was determined by using the Kaiser test. The antibacterial activity against *Staphylococcus aureus* and *Pseudomonas aeruginosa* of this nano-derivatives has been studied.

The results of the antibacterial activity indicated that only the functionalized graphene with citramide has significant antibacterial activity against the two strains of bacteria *S. aureus* and *P. aeruginosa* with MIC 0.00098, 0.00781 mg/ml respectively.