

## Preparation of Core-Shell AgBr/Cationic Polymer Nanocomposite with Dual Biocidal Modes and Sustained Release of Ag<sup>+</sup> Ions

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**Abstract :** Research on designing nano-antibacterial agent with potent and long-lasting antibacterial property is demanding and provoking work. In this study, a core-shell AgBr/cationic polymer nanocomposite (AgBr/NPVP-H10) were synthesized and its structure confirmed by Fourier Transform Infrared Spectrometer (FT-IR), Nuclear Magnetic Resonance (<sup>1</sup>H NMR) and X-ray diffraction (XRD), and the cationic polymer contents were determined with Thermal Gravimetric Analyzer (TGA). The morphology was directly observed by Transmission Electron Microscope (TEM) which showed that the nanoparticle contains single core and organic shell and had an average diameter of 30.1 nm. The antibacterial test against Gram-positive Staphylococcus aureus and Gram-negative Escherichia coli illuminated that this nanocomposite had potent bactericidal activity, which can be attributed to the contact-killing of cationic polymers and releasing-killing of Ag<sup>+</sup> ions. In addition, cationic polymer encapsulating AgBr cores gave the resin discs sustained release of Ag<sup>+</sup> ions, which may result in long-lasting bactericidal activity. The AgBr/NPVP-H10 nanoparticle with the dual bactericidal capability and long term antimicrobial effect is a promising material aimed at preventing bacterial infection.

**Keywords :** core-shell nanocomposite, cationic polymer, dual antibacterial capability, long-lasting antibacterial activity

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