Hydrophilic p(HEMA) Nanoparticles via Inverse Miniemulsion Polymerization Technique: Synthesis and Characterizations

Noor Aniza Harun, PhD, Universiti Malaysia Terengganu, Malaysia

Abstract (300 word limit)

This study highlights on the development of polymer nanoparticles with improved hydrophilicity prepared *via* inverse miniemulsion polymerization, a robust technique to prepare hydrophilic and aqueous-soluble polymeric nanoparticles. 2-hydroxyethyl methacrylate (HEMA) is excellent candidate for homo-polymerization due to its biocompatibility and biodegradability characteristic with high hydrophilicity properties. The influence of synthesis parameters including the effects of sonication time and amplitude towards the particles size and morphology of p(HEMA) nanoparticles are investigated. The formation of p(HEMA) nanoparticles are confirmed by Fourier transform infrared (FTIR).The morphology of polymer nanoparticles have been determined using scanning electron microscope (SEM) and transmission electron microscopy (TEM). Dynamic light scattering (DLS) indicates the mean diameters of p(HEMA) nanoparticles were in a range of 100 – 200 nm. The hydrophilic polymer nanoparticles obtained are expected to be further utilized in the fabrication of inorganic-polymer composite nanoparticles especially in biological applications.

Image

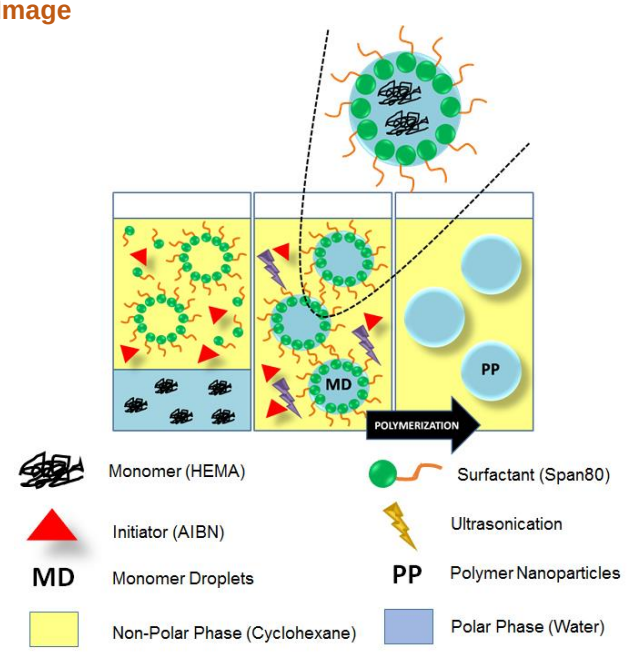


Figure 1 Inverse miniemulsion polymerization of p(HEMA) nanoparticles

Recent Publications (minimum 5)

1. **Harun NA**, Md Tahier NS, Kamaruddin NN, Mamat M and Kassim S (2018) Emulsion polymerization of poly(methacrylic acid) nanoparticles: Effects of different cationic surfactants, Asian Journal of Chemistry 30(10): 2299-2304.
2. Azmi NS, Kamaruddin NN, Kassim S, and **Harun NA** (2018) Synthesis and characterization of hydrophilic polymer nanoparticles using NIPAM via emulsion polymerization technique, IOP Conference Series: Materials Science and Engineering 440(1): 012008.
3. Hussain NS, **Harun NA**, Radzi MNFM, Idris I and Ismail WIW (2018) Biosynthesis of silver nanoparticles from marine polychaete diopatra claparedii grube, 1878, Jurnal Teknologi 80(6): 181-187.
4. Kassim S, Tharin RAA, Rusdi NF and **Harun NA** (2018) Bimatellic PMMA@Alloy(Au-Ag) in 3D hot spots as highly sensitive substrate for high performance surface-enhanced Raman scattering (SERS), ASM Science Journal 11 (Special Issue 1): 86-95.
5. Ismail Z, Kassim S and **Harun NA** (2017) Development of hydrophilic poly(N-vinylpyrrolidone) nanoparticles via inverse miniemulsion polymerization technique, AIP Conference Proceedings 1885, 020079
6. Kamaruddin NN, Kassim S and **Harun NA** (2017) Volume effect of non-polar solvent towards the synthesis of hydrophilic polymer nanoparticles prepares via inverse miniemulsion polymerization, AIP Conference Proceedings 1885, 020056
7. **Harun NA**, Kassim S, Muhammad ST, Norzam NN, Md Tahier NS (2017) The effect of nonionic surfactants on emulsion polymerization of poly(methacrylic acid) nanoparticles, AIP Conference Proceedings 1885, 020032



Biography (150 word limit)

Dr Noor Aniza Harun interests in polymer chemistry focusing on nanomaterials research areas. Her research is focused on the development of hydrophilic polymer nanoparticles and inorganic-hydrophilic polymer composite nanoparticles composed of encapsulation quantum dots (QDs) within polymer nanoparticles with potential application as fluorescent marker in medical and material sciences. All work relies strongly on organic and polymer synthesis and characterization using advanced instruments for instance dynamic light scattering (DLS), transmission electron microscopy (TEM) and confocal microspectroscopy.

Email: nooraniza@umt.edu.my

Notes/Comments: