

Effect of Emulsification Parameters on Rubber Particle Size in the Miniemulsion Polymerization of Poly(butyl acrylate)

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Poly(butyl acrylate) (PBA) rubber particles were prepared using SLS/HD miniemulsion polymerization system. Monomer droplet size of *n*-butyl acrylate (BA) was precisely controlled in the range of 100~200 nm in diameter via adjusting miniemulsification conditions. The conditions of miniemulsion was adjusted in terms of SLS/HD ratio, shearing time and intensity during sonification. We found the stable miniemulsion condition at SLS/HD ratio (10mM/45mM) and shearing amplitude of 70% for shearing time of 10 minutes in BA/SLS/HD/Water system. We, then, polymerized the miniemulsion at elevated reaction temperature to synthesize PBA rubber particle. The number of final polymer particles(5.3×10^{16}) was increased in comparison with the number of monomer droplets(3.0×10^{16}). It means that final particles were nucleated not only by monomer droplets nucleation mechanism but other homogeneous and heterogeneous nucleation mechanisms during miniemulsion polymerization. The number average molecular weight of PBA was 270,000 g/mol with polydispersity of 1.22.