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Industrial viable process of making nanoparticles of various shapes and interior structures XIAORONG WANG, Bridgestone Americas, Center for Research and Technology — Over the past 10 years, we attempted to develop industrial viable processes which were of significance in manufacturing the nanoparticles in good quality and large volume. Our effort relied on the self-assembly concepts of block macromolecules in solutions to prepare particles with a hard core made of crosslinked plastics and a soft shell made of low Tg elastomer. Depending on the type and microstructure of the copolymers, the solvent concentration and other process parameters chosen, a variety of shell-core nano-particles of different shapes (spheres, hollow spheres, ellipsoids, cylinders, linear and branched strings, disks and etc.) and sizes (5-100 nm diameter) were reproducibly synthesized. Scale-up studies led to an optimization of the manufacturing process and the production of nanoparticles in large quantities for various product application efforts. The unique performance of those nanoparticles as performance tuning additives and novel rubber reinforcing elements was explored in rubber compounds. This review describes the synthesis methods used to produce the polymer nanoparticles, the technology to modify the particles through functionalization, the means to optimize their performance for specific applications, and the methods to use those particles in rubber compounds. Collaborators: Victor J. Foltz, Kurasch Jessica, Chenchy J. Lin, Jeff Magestrelli, Sandra Warren, Alberto Scuratti, James E. Hall, Jim Krom, Mindaugas Rackaitis, Michael W. Hayes, Pat Sadhukhan, Georg G. A. Bohm

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