

Mass Production of Nano-Composites Using Electrospinning

Chitral J Angammana^{1*}, Ryan J Gerakopulos¹, Shesha H Jayaram^{1,2}

¹NanoQuan Inc

²University of Waterloo)

e-mail: cangammana@nanoquan.com

Abstract — Many conventional polymer processing technologies for compounding micro/nano composites are known in the art. These methods include direct use of high shear mixers, roll mixers, Banbury mixers, and extruders. With recent interest in advanced composites with nanoscale fillers, efforts have been made to enhance conventional processing technologies as the imposed input energy is often ineffective at breaching the energy barrier to breakup agglomerated nano-filler structures. Drawing on inspiration from the fiber spinning industry, it is presented here that, fundamental principles for extensional flow deformation of a fiber-shaped polymer can be borrowed from emerging fiber spinning technology, electrospinning, in order to implement highly effective dispersive mixing. In this article, authors discuss about a novel method developed to produce nanocomposites at mass scale using mechanical and electrical forces using a proprietary apparatus. A case study using silica nano particles and silicone rubber matrix has been presented to demonstrate the capability of the system of dispersing nano particles in highly viscous matrix materials.