# Production of electrospun zeolite-incorporated nano-microfibers from recycled PET

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Various research groups have studied the physical, mechanical and thermal properties of PET, and due to some of its advantageous properties such as non-toxicity, strength, lightweight, safety, flexibility, PET became very important and a useful raw material globally recognized as 100% recyclable. Moreover, the structure of PET has polar groups like oxygen, which seems to develop a highly selective membrane in coupling with specific chemical or biochemical reagents for contaminant removal. Furthermore, an advantage of application of PET waste materials instead of pure samples is due to the fact that there are no significant physical or chemical properties [1] between pure/virgin and recycled PET samples. So by using recycled PET one can reduce the environmental pollution and achieve low cost nanofibrous membranes. In this study, PET has been recycled from plastic bottles and then used as a material to produce a nano/microfibrous mesh by electrospinning process. The aim of the study was to produce a membrane that could serve for water filtration applications. For such an application, researchers have made certain modifications by adding nanoparticles to the fibrous structure to improve water purification properties [2, 3]. Zeolites are nanoporous crystalline alumino-silicates with a rich variety of interesting properties and industrial applications. The novelty in this work is the incorporation of zeolites into the fibrous structure, which are expected to increase the antibacterial properties of the membrane. Optimization of the fibrous structure was done by playing with various electrospinning parameters such as voltage applied, polymer concentration, flow rate and the size of zeolites added to the polymeric solution [Fig. 1] in terms of fiber structure properties.

## References

[1] *Properties of recycled and virgin poly(ethylene terephthalate) blend fibers.* **J. H. Lee, K. S. Lim, W. G. Hahm, S. H. Kim,.** 2012, Journal of Applied Polymer Science, Vol. 128, pp. 1250-1256.2. *Properties of recycled and virgin poly(ethylene terephthalate) blend fibers.* **J. H. Lee, K. S. Lim, W. G. Hahm, S. H. Kim,.** 2012, Journal of Applied Polymer Science, Vol. 128, pp. 1250-1256.Reference 1 (Calibri 11)
[2] *Potential of a functionalised nanofibre microfiltration membrane as an antibacterial water filter.* **N. Daels, S. De Vrieze, I. Sampers, B. Decostere, P. Westbroek, A. Dumoulin, P. Dejans, K. De Clerck, S.W.H.Van Hulle.** 1-2, 2011, Desalination, Vol. 275, pp. 285-290.
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## Figures

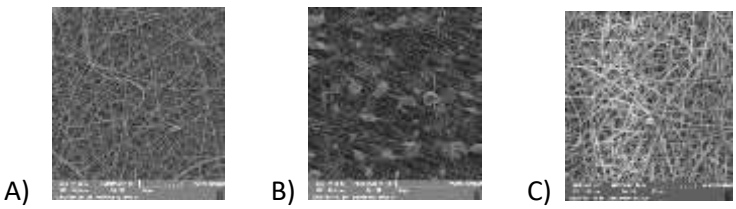


**Figure 1.** Scanning electron microscope image of PET-based nano-microfibers. A) Recycled PET and B) Commercial PET and C) Zeolite-incorporated PET.