

Effects of Atmospheric Pressure on Nanofiber Development: An Experiment Six Years in the Making!

North Penn High School Engineering Academy, The Future is N.E.A.R. (Nanotechnology Education and Research)

Towamencin, Pennsylvania—February 19, 2016— Towamencin, Pennsylvania—February 21, 2016— Engineering academy students, Nick Seiberlich, Grant Reynard, Sean Sacchetti, Jonathan Hollenbach and Mark Wallace are currently in the process of studying the effects of atmospheric pressure on nanofiber development; an idea that is over six years in the making.

The idea to study the effects of atmospheric pressure on nanofiber development began during the 2008-2009 school year. Students in the EDD research team, NanoKnights: Dylan Paproski, Brandon Rothenberger and Abu Siddique were studying the effects of polyethylene oxide (PEO) solution concentration on the size of the envelope cone of the collected nanofibers. One day, in the middle of their experimentation, the nanofibers didn't collect on the collection plate as was typically standard. Instead of collecting in a circular shape on the collection plate, the collection area had an irregular shape. They ran another experiment the same day and observed a similar irregular result. The next day, they re-ran an identical experiment to see if it would happen again and it did not. The team brainstormed possible solutions and could only think of one potential reason: there was a significant change in the atmospheric pressure.

Brandon Rothenberger had observed that the weather was extremely poor during their experimentation; it was snowing. The only idea they could come up with was that the change in atmospheric pressure, due to the poor weather, had an effect on the morphology of the envelope cone and therefore affected the area of collected nanofibers.

The following school year, in 2009-2010, Engineering Academy seniors: Andrew Koffke, Christian Jacinto and Frederick Morgan from the research team: Avant Guard, read about research that NanoKnights had done and the anomaly that was observed during electrospinning in poor weather. Over the next several weeks, they acquired materials to begin designing and constructing a chamber to test their hypothesis; unfortunately, they were not able to complete it before graduation.

Six years later, the project has been started again with interest in getting the chamber completed and tested. The students, Nick Seiberlich, Grant Reynard, Sean Sacchetti, Jonathan Hollenbach and Mark Wallace have been coming to school early to continue their research and are now ready to test the chamber. Their first experiment involved electrospinning in the closed chamber at a standard atmospheric pressure to verify that fibers could actually be generated in the vacuum chamber. They were successful! The next step is to re-run the experiment; this time, under a partial vacuum to analyze the morphology of the envelope cone.

Stay tuned... much more exciting research is coming!

If you are interested in learning more about their research, the Engineering Academy or the Technology and Engineering Education Department, please visit their websites: www.northpennengineering.org or www.thefutureisnear.org.



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