

# ***RANDCASTLE***

## **EXTRUSION SYSTEMS INC.**

TEL: (973) 239-1150 FAX: (973) 239-0830

74 Sand Park Rd, Cedar Grove, NJ 07009-1210

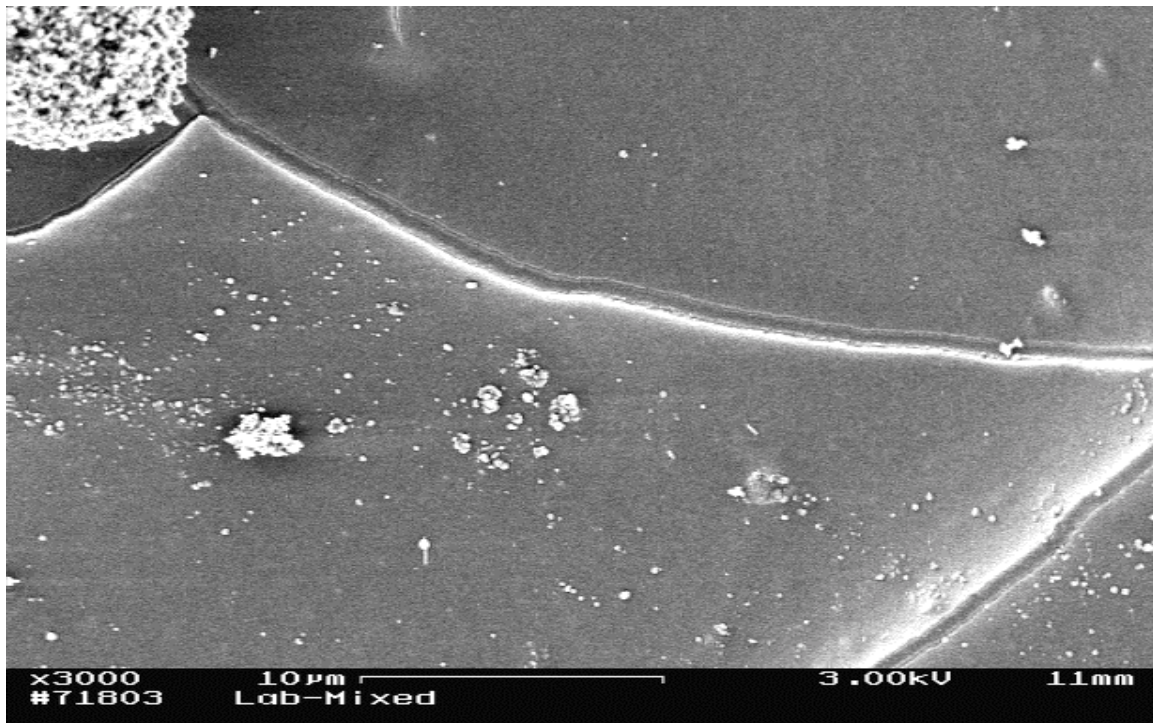
[www.randcastle.com](http://www.randcastle.com) [kluker@mail.eclipse.net](mailto:kluker@mail.eclipse.net)

### **SEM of Extruded vs. Lab-mixed Nanocomposites**

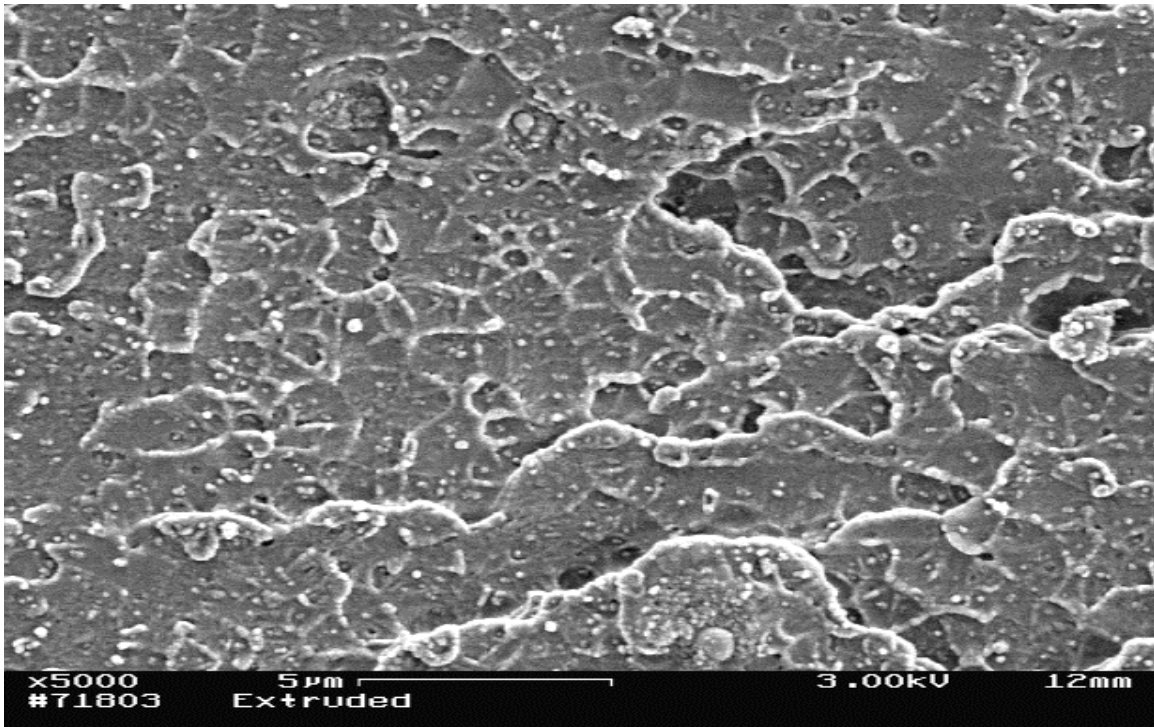
These pictures show the results of an initial trial comparing the mixing of nanopowders in a lab-mixed procedure and a Randcastle single screw compounder. The mixtures are both 5% by weight of alumina/titania dispersed in PMMA. The lab samples were prepared by suspension polymerization (the powder is added to the precursor PMMA liquid during polymerization while being mixed). The extruded experiments were prepared by dry tumbling the nanopowder with PMMA pellets before extrusion in a 50:1 L/D Randcastle  $\frac{5}{8}$  inch Microtruder with three patent pending Recirculator mixing elements. The nanopowder particles were in the 60 to 300nm range and clumped together before compounding.

#### **Microstructure**

##### **Low Magnification: Lab Sample**



### Low Magnification: Extruded Sample



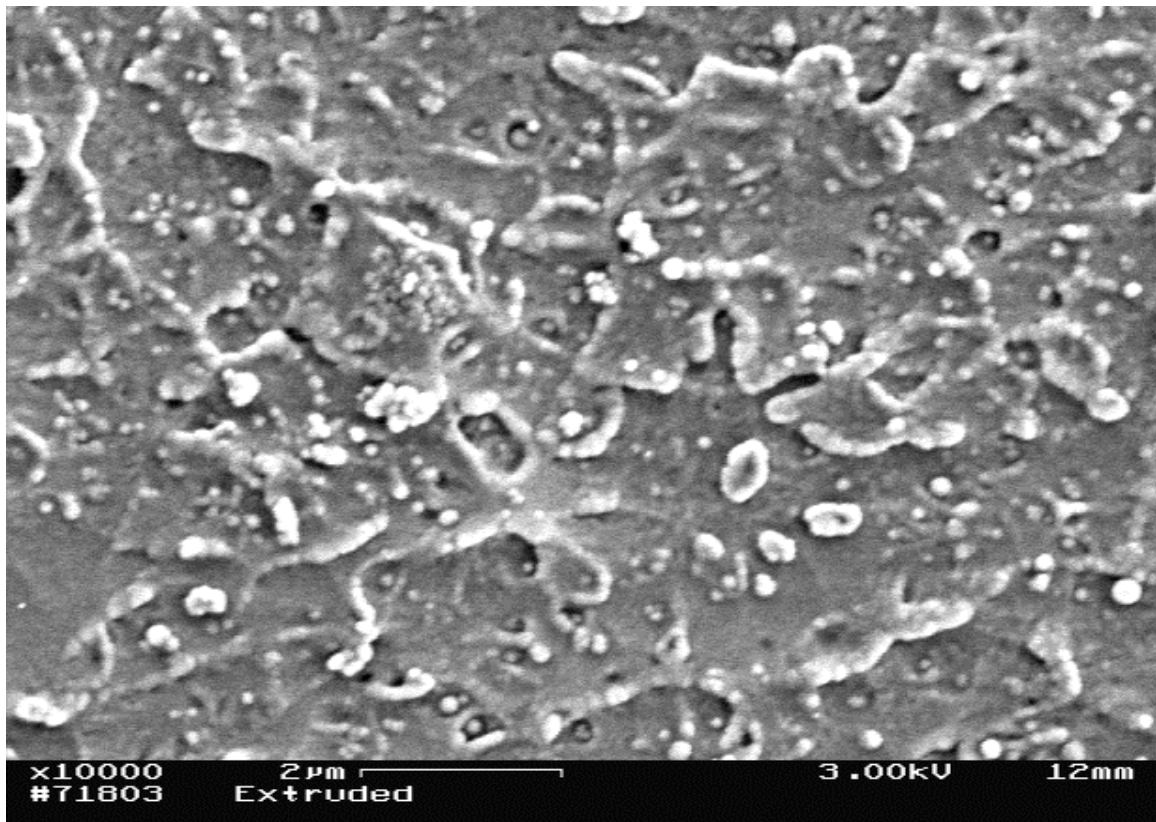
Note that there is a difference in magnification in the two pictures above.

### Medium Magnification: Lab Sample

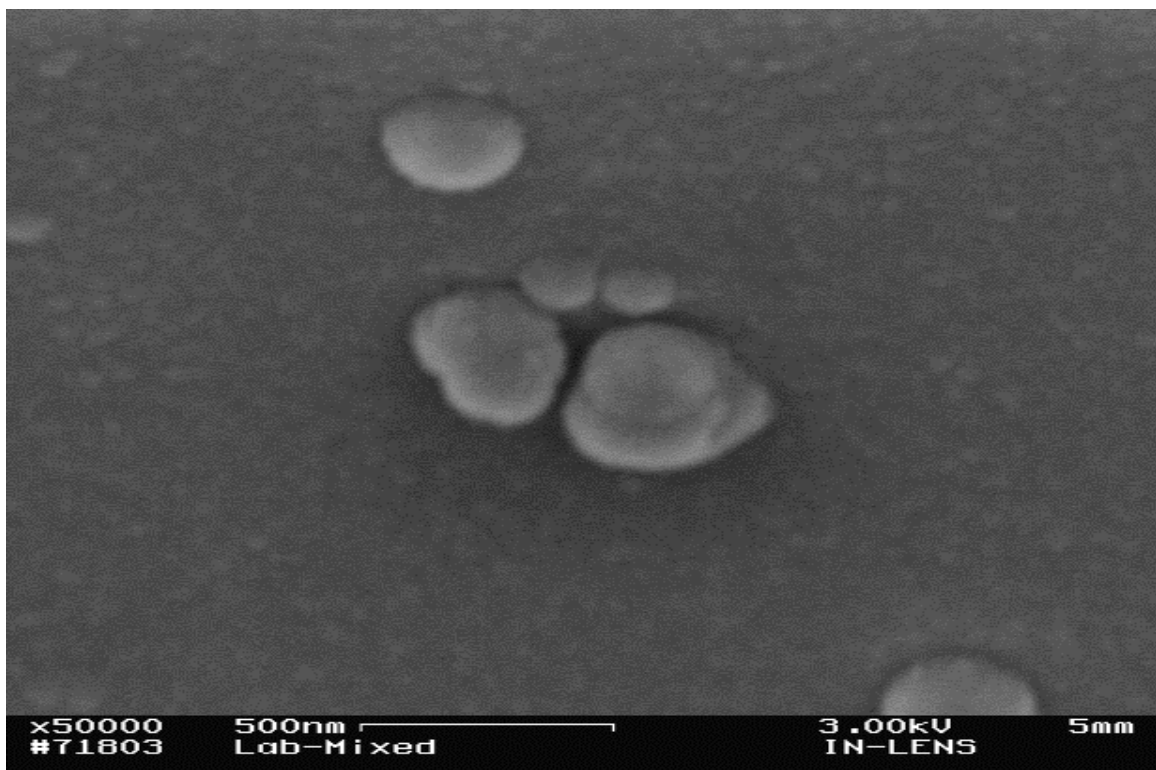




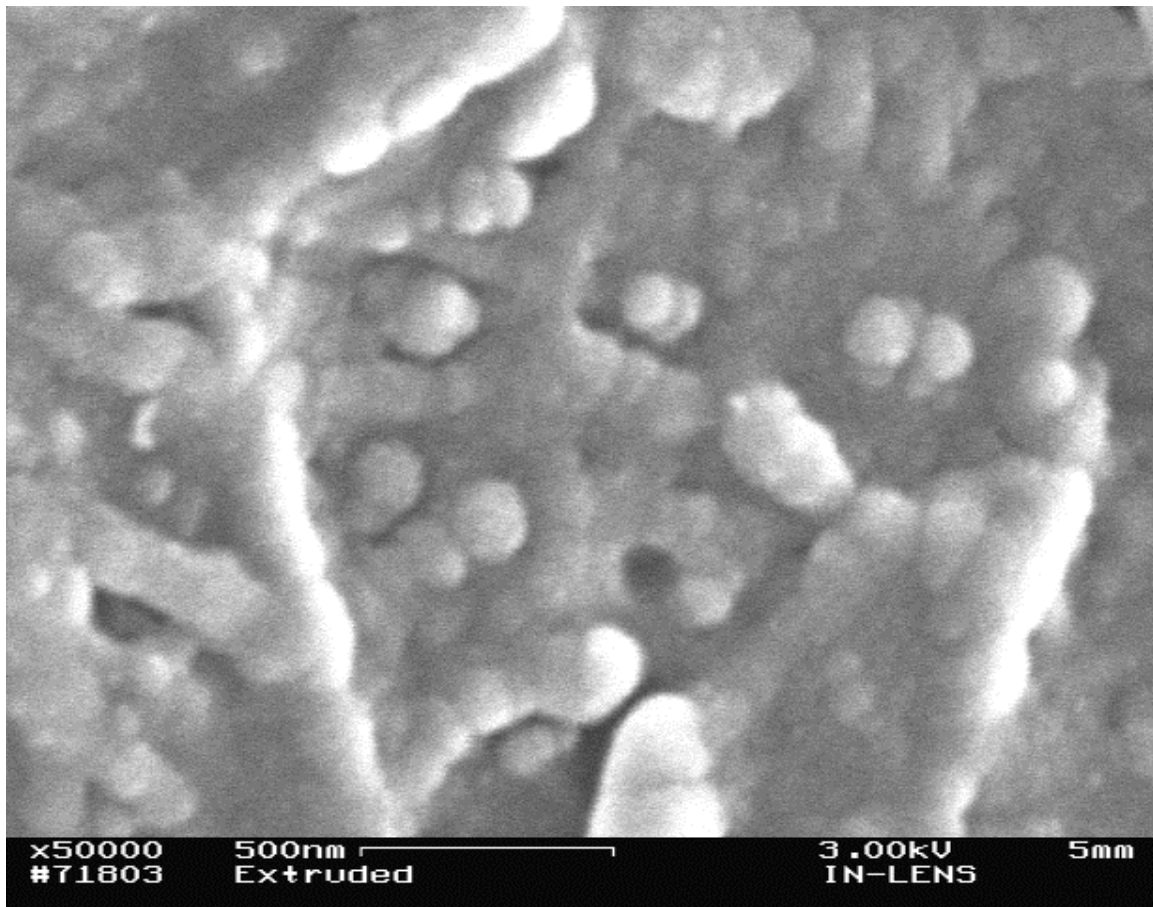
**Medium Magnification: Extruded Sample**



**High Magnification: Lab Sample**



### High Magnification: Extruded Sample



This work was a collaboration of Randcastle Extrusion Systems, Inc., and Rutgers University. The lab mixed samples and microscopy were performed at Rutgers and the extrusion compounding at Randcastle. It is our expectation that these pictures will become part of a more fully descriptive paper. Meanwhile, questions may be addressed to Keith Luker, President of Randcastle and Tom Nosker, Principle Investigator, Rutgers (AMIPP) at 732-445-3631 or [tjnosker@rci.rutgers.edu](mailto:tjnosker@rci.rutgers.edu).