

MSE SEMINAR

March 31, 2017
113 McBryde Hall
3:30 – 4:30 PM
Refreshments at 3:00 PM

Josh Marett

**Graduate Student
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“The Isolation of Cellulose Nanocrystals via Acid Hydrolysis”

ABSTRACT

The pistachio nut (*pistacia vera*) is a common food source. The shell of the nut has few known applications and is considered a waste product of the agriculture industry (agro waste). In this paper, we show a method for isolating cellulose nanocrystals (CNCs) from the pistachio shell. CNCs are well known for having very good mechanical properties which have shown themselves to be effective in many different polymer based nano-composites. We show that common methods of purifying and hydrolyzing cellulose will result in useable CNCs. We found a yield value, which is rather high for an agro waste product. We found an aspect ratio, a crystallinity, and a surface charge density. The numbers for these parameters compare well with other common commercial sources of CNCs.

BIOSKETCH

Josh Marett is a Masters student in Dr. Foster’s Advanced Materials Group. He graduated from Virginia Tech with a bachelors of science in Materials Science and Engineering with a Green Engineering minor in 2015. In 2014 he was the design team lead for the ceramic mug drop competition at the MS&T conference where his team won first place.

He was also an active member in the Materials Engineering Professional Society, a Materials Science and Engineering Undergraduate Ambassador.

Currently he is a Graduate Teaching Assistant under Dr. Thomas Staley, helping with Senior Design as well as Materials Lab 1. His research focuses on the isolation and properties of cellulose nanocrystals and their application in functional composites. He also works on a wide range of other topics including materials for battery applications and dental implants.