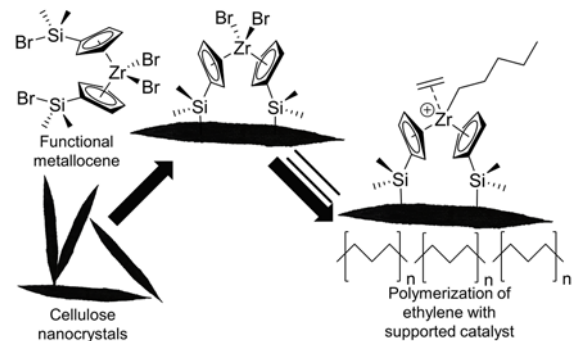


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Cellulose Nanocrystal Polyolethylene Composites via Catalyst Supported PolymerizationKeith D. Hendren,^{1,2} Sarita Hough,^{2,3} Travis W. Baughman, Paul A. Deck,^{2,3} and E. Johan Foster^{1,2}Department of Materials Science and Engineering,¹ Macromolecules Innovation Institute,²
Department of Chemistry³**Abstract:**

Cellulose Nanocrystals (CNCs) are an excellent reinforcing filler featuring a high Young's modulus, low density, and high aspect ratio. Additionally, CNCs are bio-renewable materials and are projected to decrease in cost in the near future by two orders of magnitude and are therefore in need of an application. An idealized application is as a filler in polyethylene, but as CNCs are hydrophilic and polyethylene is hydrophobic, it is difficult to combine them successfully. Previous successful dispersion in polyethylene has required copious amounts of solvent and time, additional mixing steps, or surface modification. Rejecting these methodologies, this study shows that cellulose nanocrystals can be incorporated into polyethylene composites by using existing catalyst technologies that synthesize polyethylene. We believe that this "drop-in" technology can serve as a platform for making nanocomposites from polyethylene and CNCs.

**Biography**

Keith is studying to complete a Doctor of Philosophy in Materials Science and Engineering in the Fosters Advanced Materials group and is expecting completion in Fall of 2019. He is currently funded by the ICTAS Doctoral Scholars Program. During his time at Virginia Tech he has presented orally presented at the ACS National Conference in New Orleans, after winning an MII travel scholarship. Keith subsequently won a top ten poster prize at the MII Technical Conference in 2018. Then presented a poster at the EuChemS 2018 in Liverpool. Keith is presently working on projects centered around the functionalization of cellulose nanocrystals and their incorporation into polymer matrices.

