## Cellulose Nanocrystals Suspensions as Water-Based Lubricants for Slurry Pump Gland Seals

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**Abstract :** The tribological tests were performed on a new tribometer, in order to measure the coefficient of friction of a gland seal packing material on stainless steel shafts in presence of Cellulose Nanocrystal (CNC) suspension as a sustainable, environmentally friendly, water-based lubricant. To simulate the real situation from the slurry pumps, silica sands were used as slurry particles. The surface profiles after tests were measured by interferometer microscope to characterize the surface wear. Moreover, the coefficient of friction and surface wear were measured between stainless steel shaft and chrome steel ball to investigate the tribological effects of CNC in boundary lubrication region. Alignment of nanoparticles in the CNC suspensions are the main reason for friction and wear reduction. The homogeneous concentrated suspensions showed fingerprint patterns of a chiral nematic liquid crystal. These properties made CNC a very good lubricant additive in water.

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Keywords : gland seal, lubricant additives, nanocrystalline cellulose, water-based lubricants

Conference Title : ICTT 2018 : International Conference on Tribology Technology

Conference Location : Toronto, Canada

Conference Dates : June 21-22, 2018