# Hybrid poly(lactic acid)/nanocellulose/nanoclay composites with synergistically enhanced barrier properties and improved thermomechanical resistance - DTU Orbit (09/11/2017)

## Hybrid poly(lactic acid)/nanocellulose/nanoclay composites with synergistically enhanced barrier properties and improved thermomechanical resistance

Poly(lactic acid) (PLA)-based hybrid nanocomposites (PLA, nanoclay and nanocellulose) were prepared by reinforcing neat PLA with commercially available nanoclay (Cloisite C30B) and nanocellulose, in the form of either partially acetylated cellulose nanofibres (CNFs) or nanocrystalline cellulose. Composites with 1 or 5 wt% of nanocellulose, in combination with 1, 3 and 5 wt% of nanoclay, were prepared, and their barrier properties were investigated. It was found that the combination of clay and nanocellulose clearly resulted in synergistic behaviour in terms of the oxygen transmission rate (OTR) through a reduction of up to 90% in OTR and a further reduction in the water vapour transmission rate of up to 76%. In addition, the nanocomposite films showed improved thermomechanical resistance and improved crystallisation kinetics while maintaining high film transparency. This makes the hybrid PLA/CNF/C30B nanocomposites a very promising material for food packaging applications. © 2016 Society of Chemical Industry

### General information

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