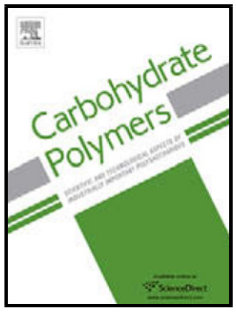

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An approach for reinforcement of paper with high strength and barrier properties via coating regenerated cellulose

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Highlights

- Reinforced paper was successfully fabricated via coating regenerated cellulose.
- The composite paper shows excellent tensile strength and barrier property.
- The composite paper exhibits strong water-resistant and shape-retaining properties.

ABSTRACT

The applications of cellulose are increasing rapidly attributing to their biodegradability and renewability. However, most of these cellulose-based materials possess poor mechanical performance, which restrict their advanced applications. In this study, a facile method was applied to fabricate composite paper with excellent mechanical and barrier properties via simple coating dissolved cellulose in ionic liquid. Subsequently, the surface wettability, oxygen permeability and mechanical properties of the resulting composites were investigated. Remarkable, both the dry and wet tensile strength of the composite papers was dramatically increased up to 101 and 14.17 MPa, which was greater than controlled paper (63.98 and 1.15 MPa). Moreover, with only 2 % weight loading of regenerated cellulose, million times decline of oxygen permeability coefficient was obtained. Though the composite papers showed enhanced hydrophilicity, it exhibited strong water-resistant and shape-