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# Characterization of the nano-cellulose aerogel from mixing CNF and CNC with different ratio

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**ABSTRACT:** In this paper, cellulose nanocrystal (CNC) and cellulose nanofiber (CNF) were prepared by chemical and mechanical methods, and their aerogel were fabricated by freeze-drying technology in combination with solvent replacement. The mixed aerogel of CNC and CNF showed better performance than that from pure CNC or CNF. What's more, the mixture ratio of CNC and CNF has great influences on the properties of the prepared aerogel. When the mixture ratio of CNF and CNC was 3:1, the internal of aerogel presents a uniform three-dimensional network structure with abundant pores. It exhibited a higher specific surface area of up to  $143 \text{ m}^2/\text{g}$  and the compressive strength was 0.202MPa under 80% strain.

**Keywords:** cellulose nanofiber; cellulose nanocrystal; mix; aerogel;

## 1. Introduction

Aerogel, a highly porous nanostructured material, which was first proposed by Kistler [1] in 1931 and gradually attracted the attention of researchers. It has been widely used in a wide range of fields, e.g adsorption, heat insulation and dielectric[2, 3]. Cellulose aerogel, known as a new generation of aerogel material following inorganic aerogel and organic polymer aerogel. It not only shows the traditional features of aerogels (high specific surface area, high porosity, low dielectric constant, etc [4].), but has renewable, biocompatible and some other merits due to its raw material cellulose [5]. Nano-cellulose is attracting increasing interest due to unique properties, such as high mechanical strength, high purity, high degree of

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