

Nanocellulose as a Turbulence Dampener

Background

Paper is produced by dewatering a dilute suspension of fibres. Unfortunately, pulp fibres have a strong tendency to form local networks, or “flocs”, which results in an uneven distribution of material in the sheet. Large efforts are made to reduce the effects of the flocculation in order to get a uniform sheet structure, i.e. a good “formation”. The rheology of the fibre suspension plays an essential role. It is possible to decrease the fibre flocculation, and thereby also improve the formation, by using formation agents. These are high molecular weight polymers, such as A-PAM. It is believed that the beneficial effect on the formation is coupled to a dampening of the turbulence in the suspension. The drawback with these formation agents is, besides the costs that they are very fragile, which makes them difficult to use in the industrial process.

Innventia has recently developed a new type of cellulose material called nanocellulose or microfibrillated cellulose (MFC). This material is composed of very long and thin (10-20 nm) crystalline cellulose particles. Suspensions of MFC have an interesting rheological behaviour, which could be used to influence the rheology of a fibre suspension. Hence, MFC could possibly be used as a formation agent. The advantage over traditional formation agents would be that MFC is not fragile, and thus more suitable in an industrial environment.

Purpose of Thesis Work

The purpose of this thesis work is to compare the influence of A-PAM and MFC on turbulence close to a solid boundary. This will be done through Laser Doppler Velocimetry measurements of the turbulent flow down an inclined plate. The work will be performed both at Innventia’s facilities in Stockholm, and in the Fibre Suspension Laboratory at KTH Mechanics, Stockholm.

Contact persons:

Mikael Ankerfors, telefon: 08-676 72 61

e-post: mikael.ankerfors@innventia.com