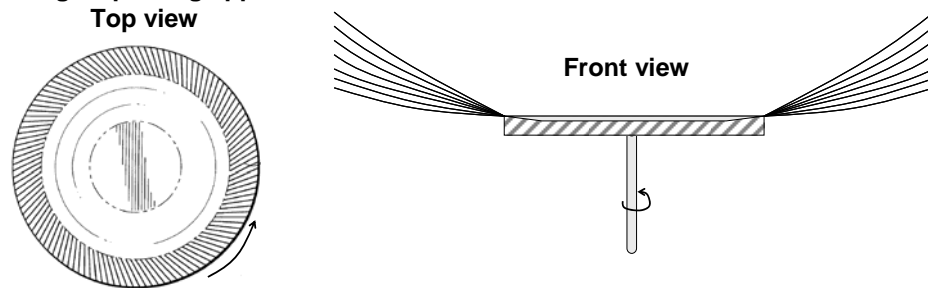


V. Nanofiber Formation via Centrifugally Driven Spinning Process

Proposed by Yong L. Joo

Polymer nanofibers have great potential for applications in a wide variety of fields, including high performance filtration, sensing, and biomedical engineering. Producing nanofibers directly from polymer melts have been pursued due to drawbacks of current solution based processes for nanofibers such as low productivity, high operation cost and environmental concerns, but no success has been made to address the industrial demand. Recently, DuPont has developed a new spinning process for nanofiber formation based on centrifugal force on a rotational disk (PolyAP spinning process) which can offer high production rate and low process cost and can overcome current barriers to commercializing nanofibers from melt. We propose a study which will provide a better understanding of the interplay between processing conditions and microstructural development during the nanofiber formation via centrifugal force. Together with our modeling and numerical simulation of free surface flow of viscoelastic fluids on a rotating disk, we will design a centrifugal spinning process which can be applied to various complex systems including inorganic and composite materials.

Centrifugal spinning apparatus



Fingering instability on a rotating disk

