

# **Spherulitic structure in cellulose-fiber reinforced polypropylene**

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## **Abstract**

The spherulitic structure in cellulose fiber-reinforced polypropylene was investigated by polarized light microscopy of thin films and scanning electron microscopy of acid-etched specimens. We studied the microstructure of thin films microtomed from injection-molded composites. We also studied the microstructure of recrystallized versions of these films. Spherulite type, size, and band structure in the recrystallized polypropylene films varied with the amount of undercooling in isothermal crystallization. Cellulose fibers nucleated spherulitic growth in these films but did so inconsistently, even within samples. To examine spherulites by polarized light microscopy, we needed films as thin as the spherulites (20  $\mu\text{m}$ ).

However, we could not microtome injection-molded composites to 20  $\mu\text{m}$  without tearing. A scanning electron micrograph of acid-etched specimens revealed spherulitic structure in the injection-molded samples containing little or no cellulose fibers. No spherulites were detected in samples containing more than 5 percent by weight cellulose fiber. Spherulitic structures emanating from fibers always appeared in injection-molded samples containing less than 5 percent by weight cellulose fibers. Hence, cellulose fibers clearly nucleate polypropylene crystallization.

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