Polypropylene Laue IP analysis

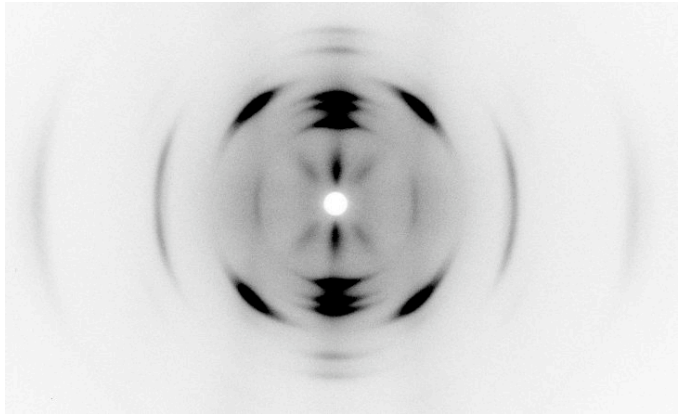
Part of the poster:
L. Fambri & L. Lutterotti, Structural and mechanical characterization of oriented polypropylene (fibers and woven nonwoven fabrics)
In: Current and future trends in polymeric materials
Prague, 26-30 June 2005

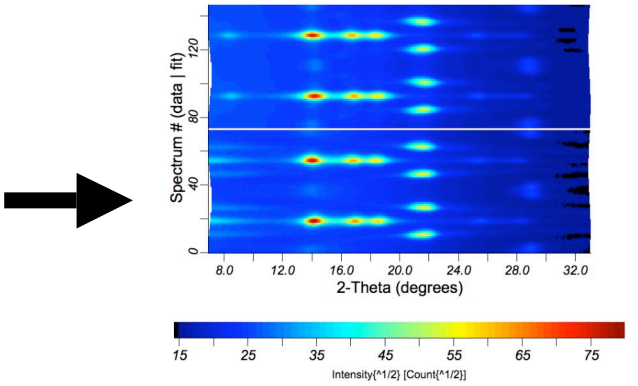
Polypropylene fibers: XRD analysis

Experimental Transmission Images

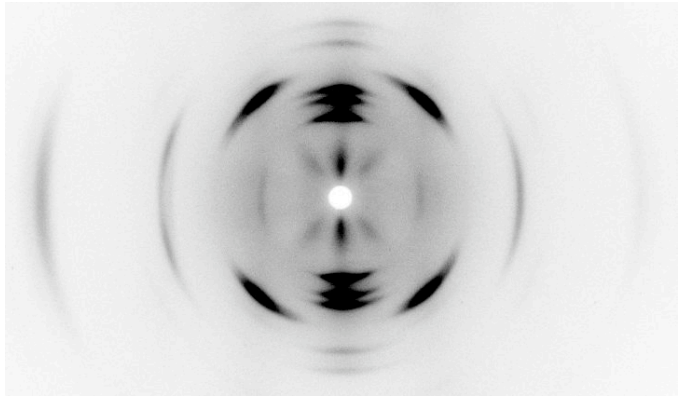
Images transformed in spectra and Fitted using Rietveld Texture Analysis

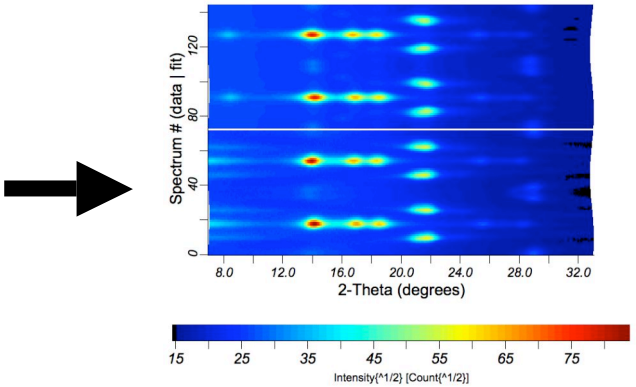
Original fibers



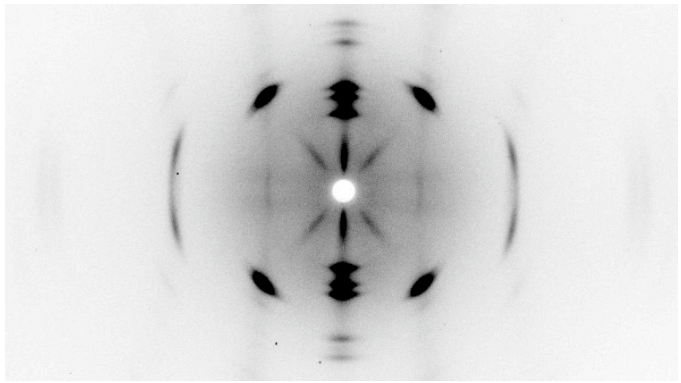


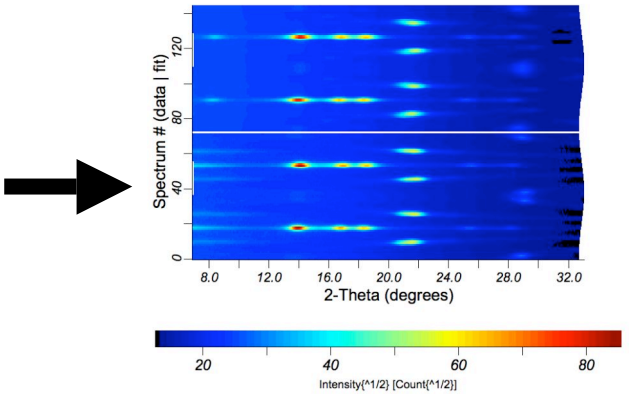
Creep 78 MPa





DMTA 16 MPa



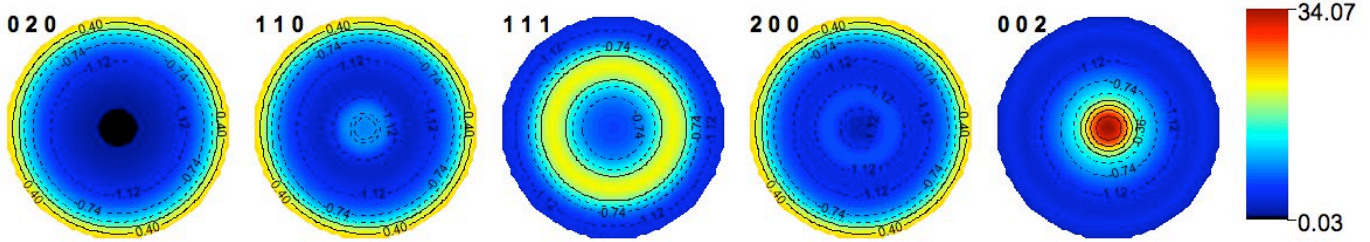


Polypropylene fibers: results of Rietveld texture analysis

Reconstructed pole figures from the fitted Orientation Distribution Function (ODF) Plotted in log scale in m.r.d. (multiple of random distribution). Higher maximum values means sharper texture. Fibers aligned (00l).

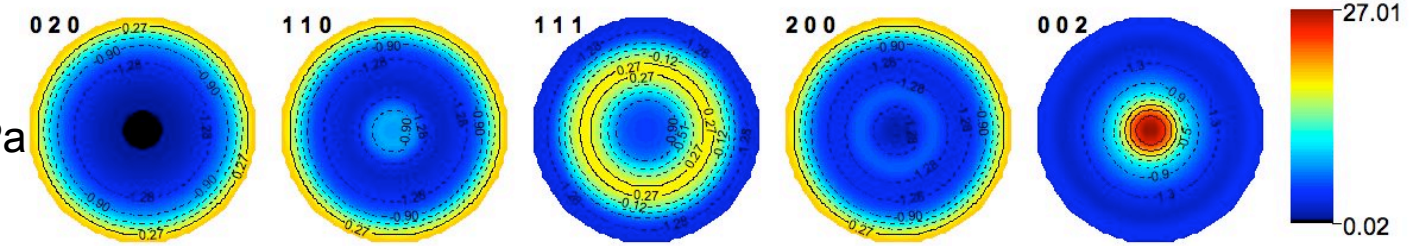
Fiber dispersion In degrees

Original fibers



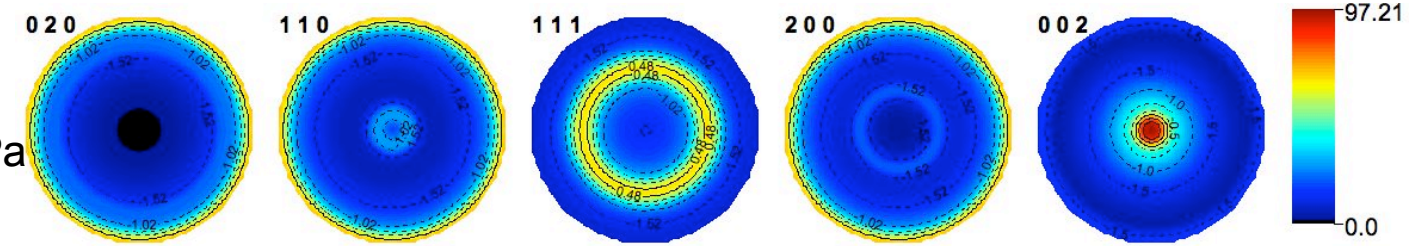
15.8

Creep 78 MPa



17.9

DMTA 16 MPa



9.1

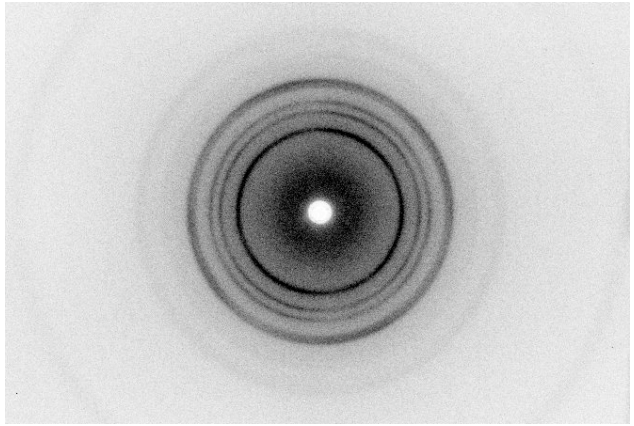
Note: the creep at ambient temperature does not change significantly the texture.
The DMTA at high temperature increase the fiber alignment by 3 times

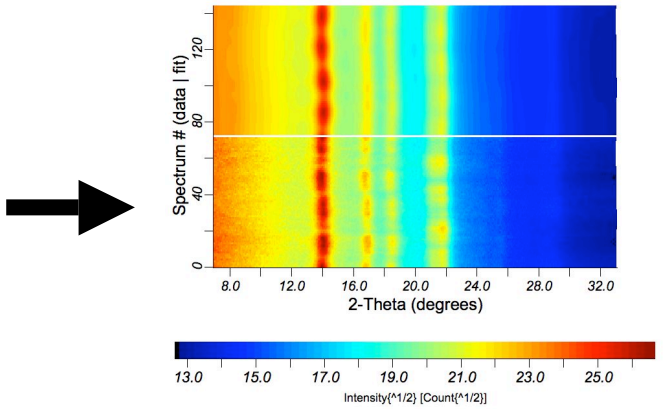
PP Woven/not-woven

Experimental Laue Images

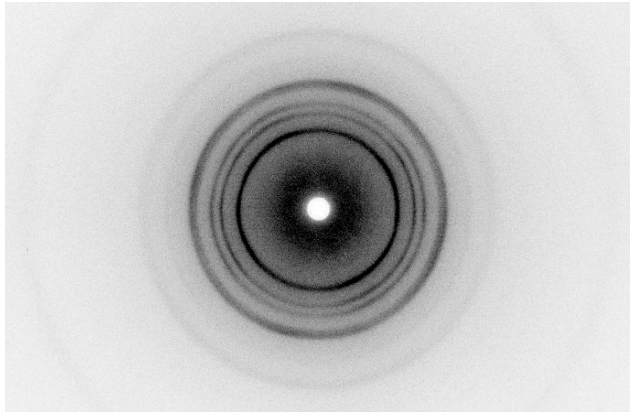
Images transformed in spectra and Fitted using Rietveld Texture Analysis

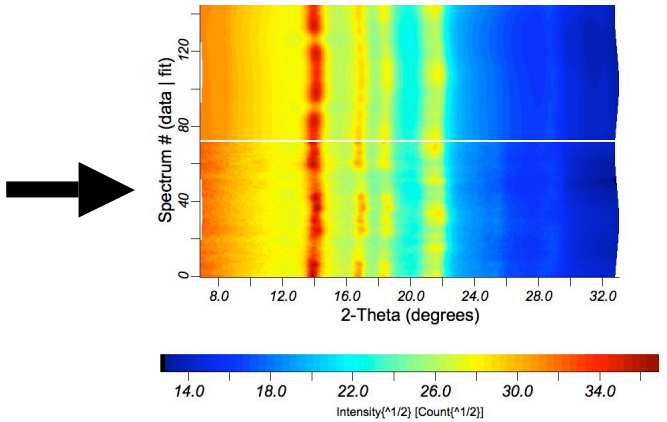
Original



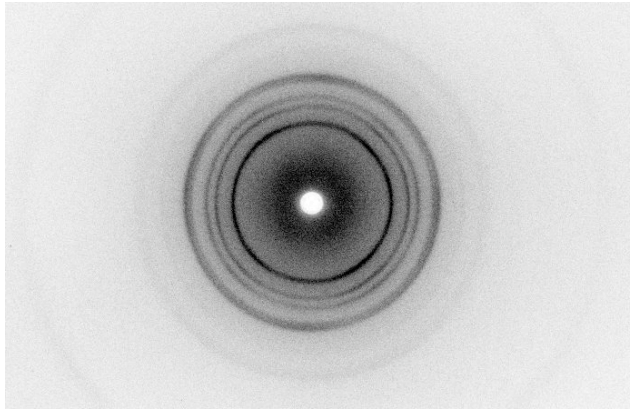


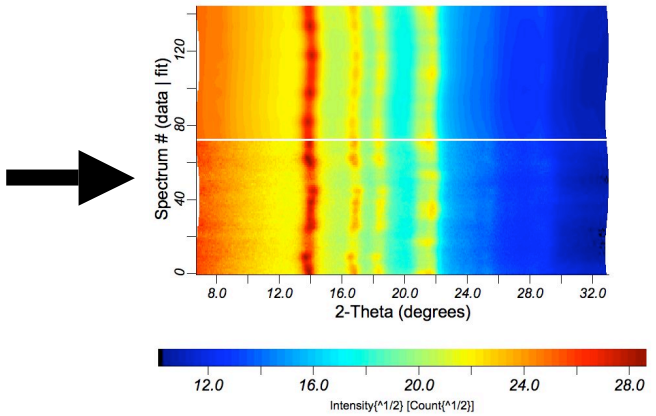
Machine direction





Transverse direction





PP woven/not-woven: results of Rietveld texture analysis

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Plotted in m.r.d. (multiple of random distribution). Higher maximum
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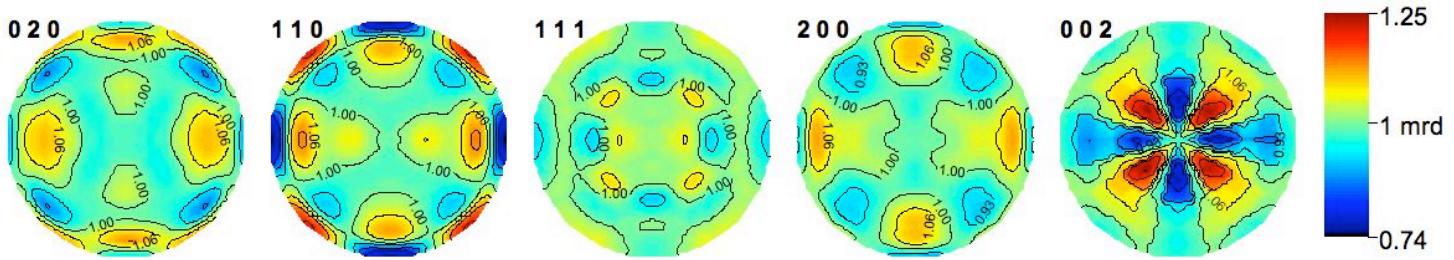
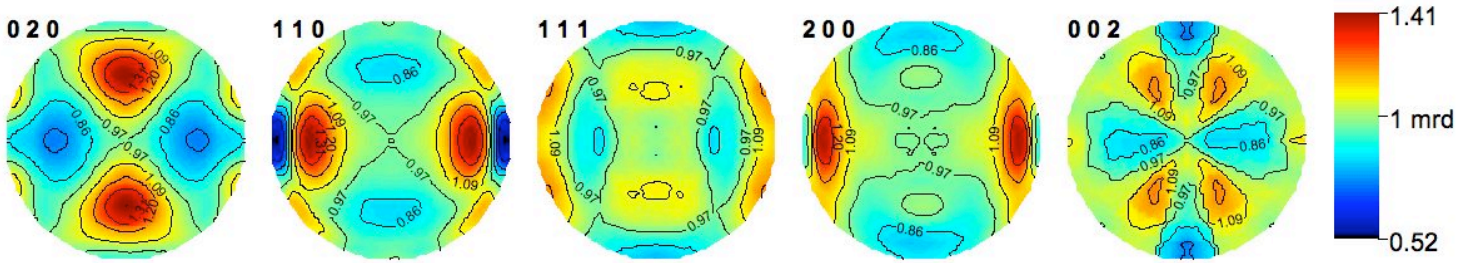
Original



Machine direction



Transverse direction