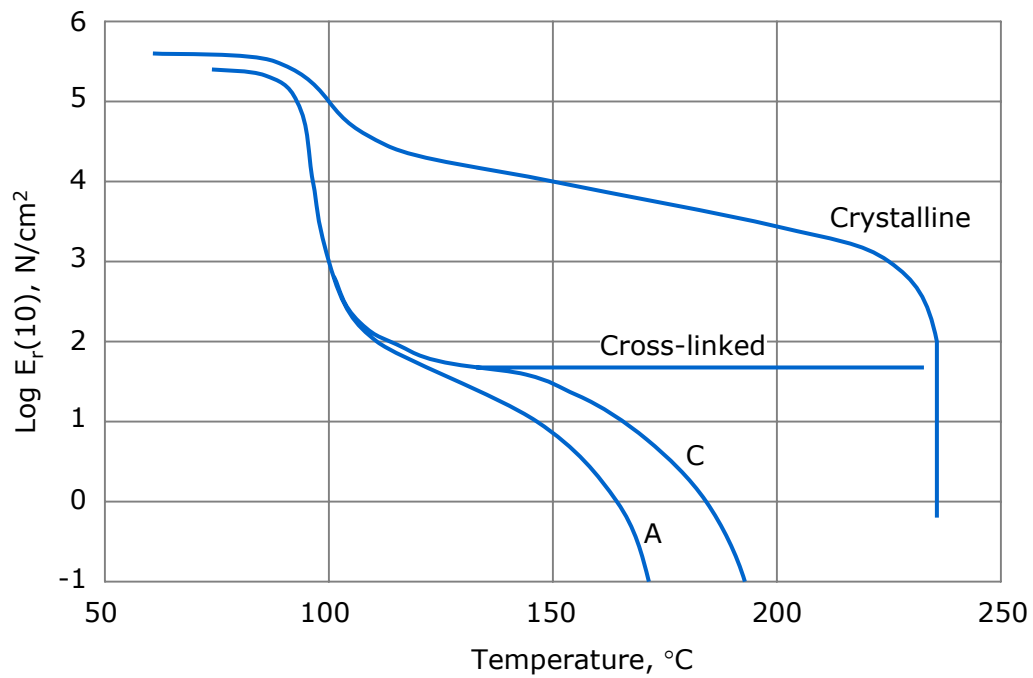


## Lecture 4

### Polymer Crystallinity

Example: Spherulites

See Figures 2.4 and 2.8 in McCrum, N.G. "Principles of polymer engineering"  
New York: Oxford University Press, 1997



after Arthur Tobolsky, *Properties and structure of polymers* (Wiley, 1960)

# Glass Transitions

		$T_g, ^\circ\text{C}$
poly $\alpha$ -methyl styrene	$-\text{CH}_2-\overset{\text{CH}_3}{\underset{\text{C}_6\text{H}_5}{\text{C}}}-$	175
polycarbonate (PC)	$-\text{O}-\text{C}_6\text{H}_4-\overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}}-\text{O}-\text{C}_6\text{H}_4-\text{O}-\overset{\text{O}}{\parallel}{\text{C}}-$	150
polyacrylonitrile (PAN)	$-\text{CH}_2-\overset{\text{H}}{\underset{\text{C}\equiv\text{N}}{\text{C}}}-$	104
polystyrene (PS)	$-\text{CH}_2-\overset{\text{H}}{\underset{\text{C}_6\text{H}_5}{\text{C}}}-$	100
polyvinyl chloride (PVC)	$-\text{CH}_2-\overset{\text{H}}{\underset{\text{Cl}}{\text{C}}}-$	83
polyethylene terephthalate (PET)	$-\text{O}-\overset{\text{O}}{\parallel}{\text{C}}-\text{C}_6\text{H}_4-\overset{\text{O}}{\parallel}{\text{C}}-\text{O}-\text{CH}_2-\text{CH}_2-$	69
nylon 66	$-\overset{\text{O}}{\parallel}{\text{C}}-(\text{CH}_2)_4-\overset{\text{O}}{\parallel}{\text{C}}-\underset{\text{H}}{\text{N}}-(\text{CH}_2)_6-\underset{\text{H}}{\text{N}}-$	50
polypropylene (PP)	$-\text{CH}_2-\overset{\text{H}}{\underset{\text{CH}_3}{\text{C}}}-$	-19
polyisoprene (NR)	$-\text{CH}_2-\overset{\text{C}=\text{C}}{\underset{\text{CH}_3 \quad \text{H}}{\text{C}}}-\text{CH}_2-$	-73
polyethylene (PE)	$-\text{CH}_2-\text{CH}_2-$	-80
poly-dimethyl siloxane	$-\overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{Si}}}-\text{O}-$	-123

See graphs of glass transition temperature in  
Bicerano, Josef. *Prediction of Polymer Properties*.  
New York: Marcel Dekker, 2002