FIGURE 6.1 Polymerization of ethene monomer to polyethene.

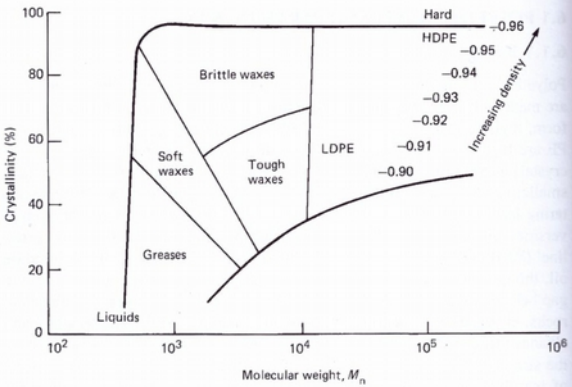

FIGURE 6.2 Correlation of properties of polyethene with crystallinity and molecular weight. *Adapted from Richards (1951).*

molecular weight) at room temperature. Petroleum jelly, microcrystalline wax swollen with oil, is a pasty grease at room temperature. PE and waxes are inert to aqueous chemicals and to many organic solvents. PE and waxes are subject to photo-oxidation, undergoing degradation, cross-linking, embrittlement and discoloration, with microcrystalline wax being slightly more susceptible than paraffin wax. PE (and wax) has a low glass transition temperature and is subject to dirt pick-up.

Ethene is frequently copolymerized with other monomers to modify its properties. Propene, alone (PP) or copolymerized with ethene, creates a more rigid polymer that can be heated to higher temperatures. It is therefore widely

TABLE 6.1 Hydrocarbon Polymer Properties (see also Table 2.1)

Material	CAS No.	Molecular Weight[1]	Melt Flow Index[2]	Branching	n_D[3]	Softening Point (°C)	Typical Products
Petroleum jelly		450		High	1.43	45–60	Petrolatum
Paraffin wax	8002-74-2	300	2000	Very low	1.53	40–65	
Microcrystalline wax	63231-60-7	600		Very high	1.45	55–85	Cosmolloid (Astor)
Polyethene wax	9002-88-4	2000		Variable		106	Lumax A (was Wax A) (BASF)
LDPE	9002-88-4	24,000	20	Moderate	1.51	108	
HDPE		200,000	0.02	Very low	1.52	130	
Rubber	9006-04-6	500,000		Low	1.52	−77 (T_g)	
Gutta-percha	9000-32-2	70,000		Low	1.51	33 (T_g)	
Chlorinated rubber	9006-03-5					50 (T_g)	Alloprene (was ICI)

[1] *Approximate molecular weight (M_n).*
[2] *A measure of the ability to flow at 190°C; lower molecular weights have higher values.*
[3] *Approximate refractive index at room temperature.*