

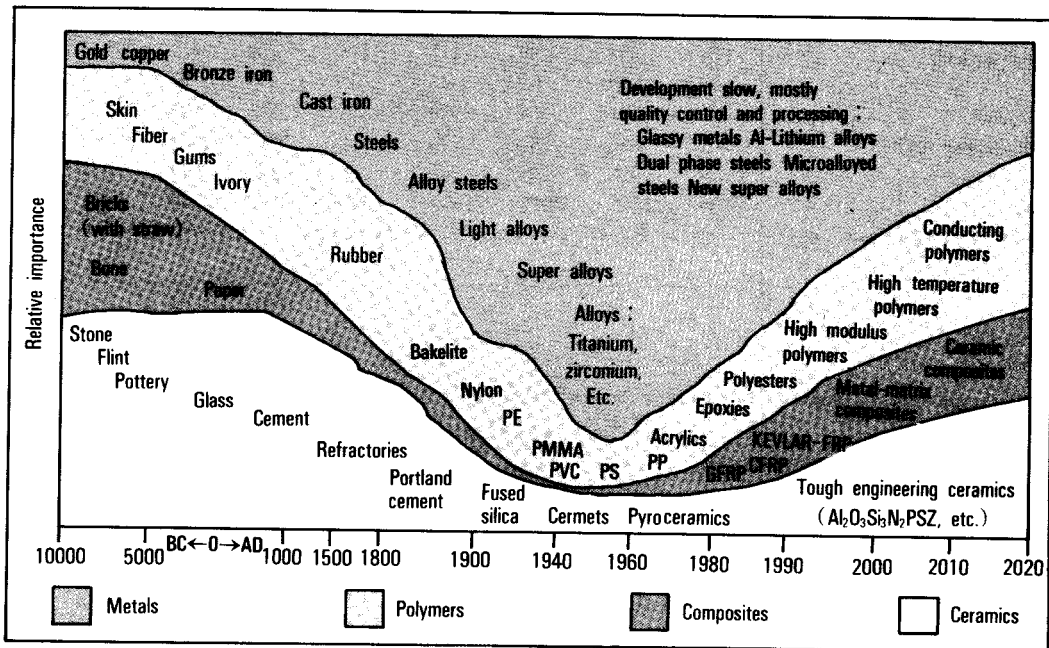


Fig. 1. Evolution of engineering materials. PE = polyethylene ; PMMA = polymethylmethacrylate ; PS = polystyrene ; PP = polypropylene ; PVC = polyvinylchloride ; GFRP = graphite fiber reinforced plastic ; CFRP = carbon fiber reinforced plastic (1)

〈CHEMTECH OCTOBER 590, 1990〉

선진국의 고분자 생산 동향

미국

Synthetic Fibers : Only nylon and polyolefins grow, and those modestly

Millions of lb	Production							Annual change	
	1989	1988	1987	1986	1985	1983	1981	1979	'88-'89
NONCELLULOSIC FIBERS									
Acrylic ^a	543	588	592	616	631	671	691	761	-8%
Nylon ^b	2740	2669	2689	2514	2343	2419	2332	2720	3
Olefin ^c	1639	1588	1494	1393	1249	906	785	759	3
Polyester	3594	3681	3541	3305	3341	3544	4176	4178	-2
CELLULOSIC FIBERS									
Acetate ^d	580	614	605	619	558	229	261	324	-6
Rayon						401	509	606	-5
TOTAL	9096	9140	8921	8447	8122	8168	8754	9348	0

^a Includes modacrylic. ^b Excludes aramid in 1983~87. ^c Includes olefin yarn and monofilaments and olefin and vinyon staple, tow, and fiberfill. ^d Includes diacetate and triacetate ; excludes production for cigarette filters. Source : Fiber Economics Bureau

Synthetic Rubber : Growth of recent years leveled off in 1989

Thousands of metric tons	Production							Annual change	
	1989	1988	1987	1986	1985	1983	1981	1979	'88-'89 '79-'89
Ethylene-propylene	260	263	254	230	215	175	178	175	-1% 4%
Nitrile	69	76	69	59	53	55	66	75	-9 -1
Polybutadiene	411	407	371	336	330	333	342	397	1 0
Styrene-butadiene rubber	874	909	850	792	735	904	1032	1378	-4 -5
Other ^a	688	679	638	596	505	468	404	509	1 3
TOTAL	2302	2335	2182	2013	1838	1935	2022	2534	1% -1%

^a Includes butyl, polychloroprene, polyisoprene, silicone, and other synthetic elastomers. Some values are estimated. **Source :** Rubber Manufacturers Association

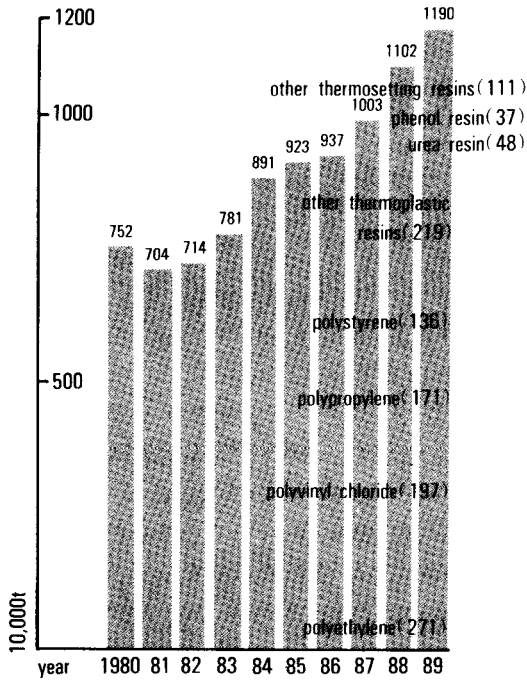
Plastics : Production of major resins generally declined last year

Millions of lb ^a	Production							Annual change	
	1989	1988	1987	1986	1985	1983	1981	1979	'88-'89 '79-'89
THERMOSETTING RESINS									
Epoxy ^b	510	486	433	398	385	334	336	361	5% 4%
Melamine	222	207	212	173	192	180	179	200	7 1
Phenolic ^c	2,879 ^d	3,066 ^d	2,869 ^d	2,735 ^d	2,621 ^d	2,477 ^d	2,333 ^d	1,781	-6 nc
Polyester ^c	1,319	1,404	1,367	1,271	1,223	1,084	997	1,147	-6 4
Urea	1,477	1,425	1,382	1,271	1,210	1,172	1,165	1,367	4 1
TOTAL	6,407	6,588	6,263	5,848	5,631	5,247	5,010	4,856	-3 nc
THERMOPLASTIC RESINS									
Polyethylene									
Low density ^f	9,695	10,397	9,599	8,903	8,889	8,041	7,693	7,793	-7 2
High density ^g	8,102	8,400	7,995	7,182	6,671	5,689	4,695	5,010	-4 5
Polypropylene	7,238	7,274	6,647	5,812	5,139	4,433	3,955	3,841	0 7
Styrene polymers									
Polystyrene	5,104	5,187	4,780	4,470	4,054	3,570	3,621	4,005	-2 2
Styrene-acrylonitrile	113	148	126	92	87	93	107	124	-24 -1
Acrylonitrile-butadiene-styrene and other styrene polymers ^h	2,394	2,418	2,254	2,196	2,036	1,889	1,745	2,107	-1 1
Polyamide, nylon type	569	566	507	465	399	321	312	327	1 6
Vinyl resins									
Polyvinyl chloride and copolymers	8,478	8,350	7,971	7,256	6,772	6,067	5,707	6,119	2 3
Other vinyl resins ⁱ	220	222	212	195	190	186	208	220	-1 0
Thermoplastic polyester	1,630	1,652	1,394	1,175	965	778	609	na	-1 na
TOTAL	43,5437	44,614	41,485	37,746	35,202	31,067	28,652	29,546	-2% 4%

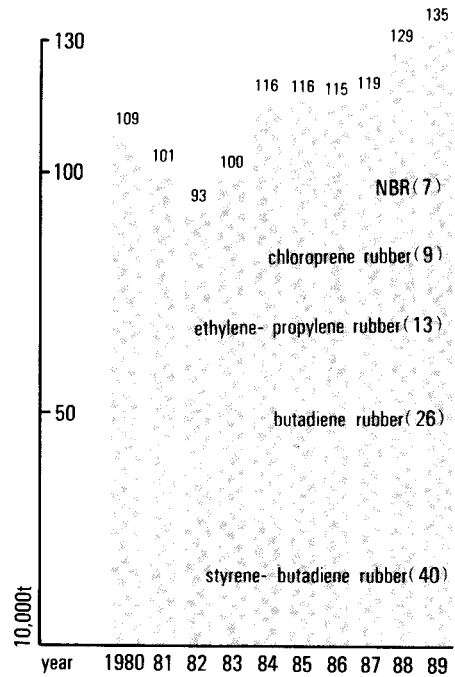
Note : Totals are for those products listed and exclude some small-volume plastics. ^a Dry-weight basis unless otherwise specified. ^b Unmodified. ^c Includes other tar acid resins. ^d Gross-weight basis. ^e Unsaturated. ^f Density 0.940 and below. ^g Density above 0.940. ^h Includes styrene-butadiene copolymers and other styrene-based polymers. ⁱ Includes polyvinyl butyral, polyvinyl formal, and polyvinylidene-chloride. na= not available. nc= not comparable. **Source :** Society of the Plastics Industry

◀C & EN, June 18, 40-41, 1990▶

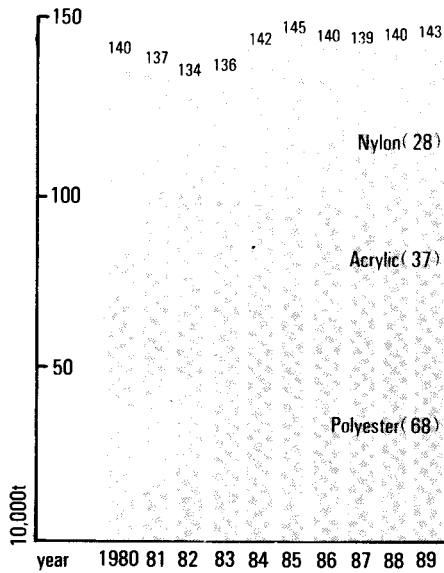
Plastics



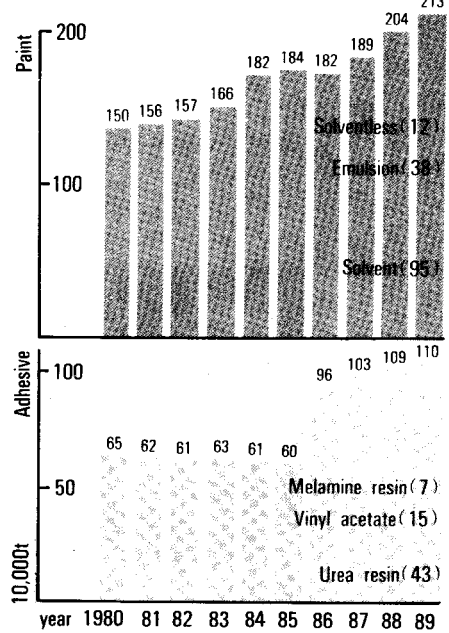
Synthetic Rubber



Synthetic Fiber



Paint, Adhesive



<高分子(日本) 40巻 1月號 p.36 (1991)>