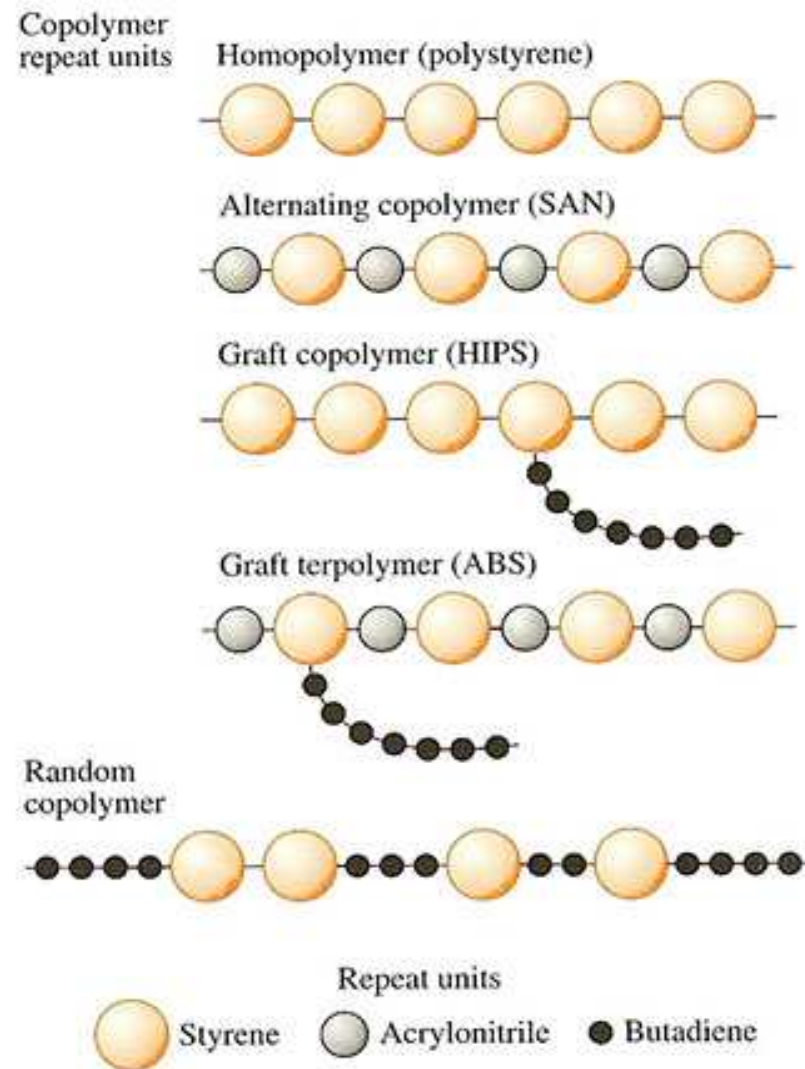


# Monômeros e polímeros

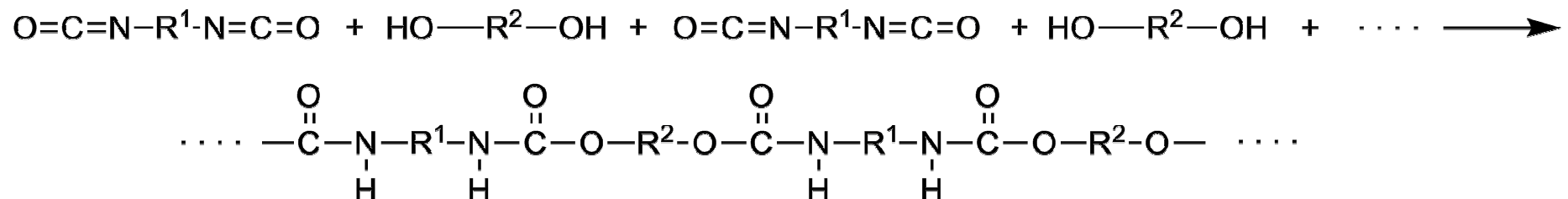
- Há muitas maneiras de montar cadeias.
- Cadeias diferentes geram produtos com propriedades diferentes.

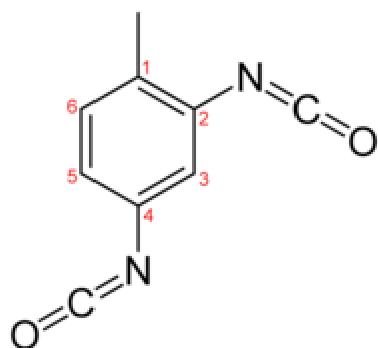
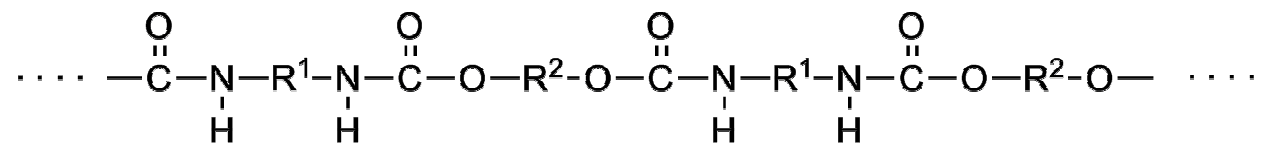
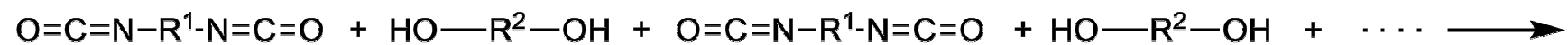


# Monômeros formando blocos, ou alternados, ou ao acaso

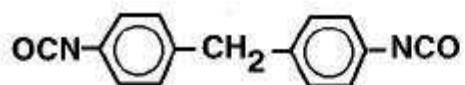


- Copolímeros-bloco: um bloco flexível, outro rígido: que propriedades tem o polímero?

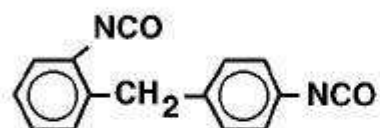




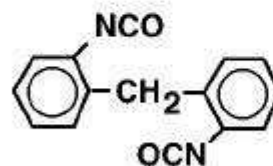
4,4'



2,4'



2,2'



Pure MDI's



Polymeric MDI's

## Search Results

Materials that match your search criteria: 87 /87 null

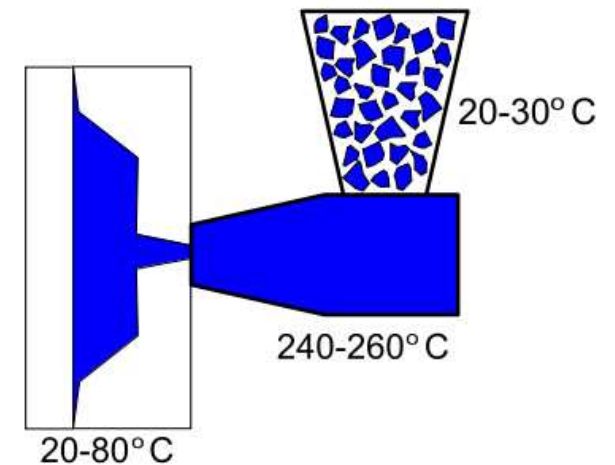
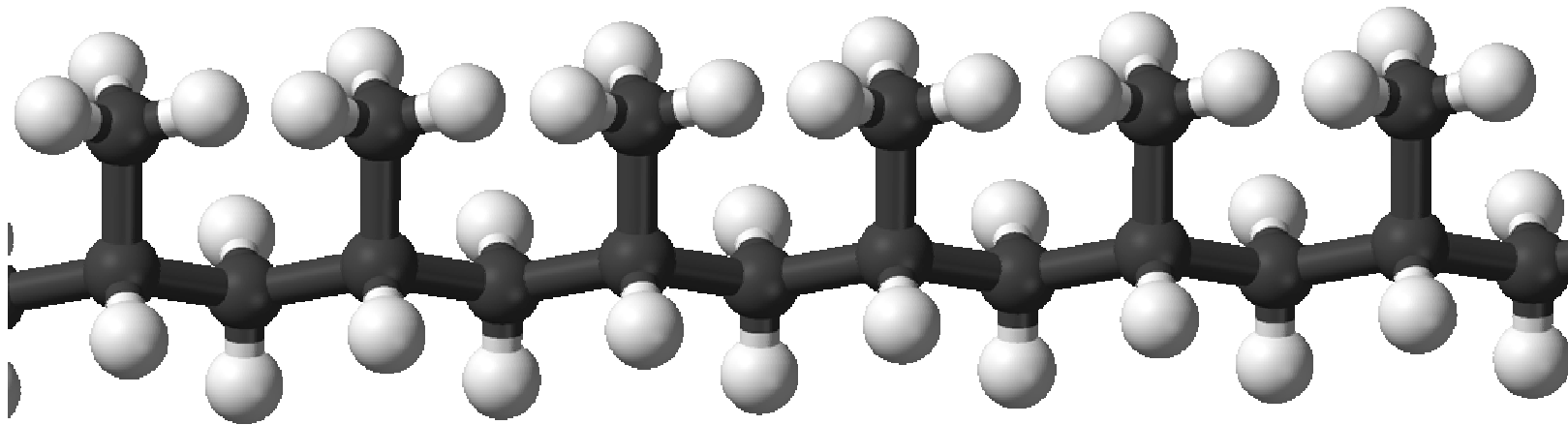
Product Family	Grade	Hardness	Color	Bonds To	Specific Gravity	Ultimate Tensile*	100% Modulus*	Ultimate Elongation*	Tear Strength*	NSF	FDA	UL	USP VI
Dynaflex®	<a href="#">D3202-1000-03</a>	59 A	Nat	PS, HIPS	0.99	700	670	230	140				
Dynaflex®	<a href="#">D3204-1000-03</a>	82 A	Nat	PS, HIPS	1.01	1240	990	400	260				
Dynaflex®	<a href="#">D3226-1000-03</a>	40 A	Nat	PS, HIPS	0.99	580	430	270	90				
Dynaflex®	<a href="#">G2701-1000-02</a>	66 A	Trans	PP	0.90	1050	490	590	240	Yes			
Dynaflex®	<a href="#">G2703-1000-00</a>	58 A	Trans	PP	0.90	1160	310	690	180	Yes			
Dynaflex®	<a href="#">G2706-1000-00</a>	28 A	Trans	PP	0.89	1010	90	710	80	Yes		Yes	
Dynaflex®	<a href="#">G2709-1000-00</a>	53 A	Trans	PP	0.89	980	240	670	140	Yes			
Dynaflex®	<a href="#">G2711-1000-00</a>	43 A	Trans	PP	0.89	830	180	650	130	Yes		Yes	
Dynaflex®	<a href="#">G2712-1000-02</a>	43 A	Trans	PP	0.89	820	190	700	110	Yes			
Dynaflex®	<a href="#">G2755-1000-00</a>	55 A	Trans	PP	0.88	770	220	700	120	Yes			
Dynaflex®	<a href="#">G2780-0001</a>	84 A	Trans	PP PE	0.90	1200	840	370	250	Yes			
Dynaflex®	<a href="#">G6703-0001</a>	3 A	Trans	PP	0.90	390	20	1030	40				
Dynaflex®	<a href="#">G6713-0001</a>	13 A	Trans	PP	0.88	200	57	540	40	Yes			
Dynaflex®	<a href="#">G6730</a>	30 A	Trans	PP	0.91	740	110	530	80				
Dynaflex®	<a href="#">G7410-1000-00</a>	64 A	Nat	PP	0.91	700	390	420	160				
Dynaflex®	<a href="#">G7431-1001-00</a>	66 A	Nat	PP	0.92	1330	390	610	200				
Dynaflex®	<a href="#">G7702-9001-02</a>	37 A	Black	PP	1.10	600	140	480	120				
Dynaflex®	<a href="#">G7736-1</a>	37 A	Nat	PP	1.06	430	150	600	80	Yes			
Dynaflex®	<a href="#">G7930-1001-00</a>	30 A	Nat	PP	1.06	490	130	650	100	51	Yes	HB	
Dynaflex®	<a href="#">G7930-9001-02</a>	30 A	Black	PP	1.06	400	100	640	90	51	Yes	HB	
Dynaflex®	<a href="#">G7940-1001-00</a>	40 A	Nat	PP	1.18	450	180	450	100	51	Yes	HB	
Dynaflex®	<a href="#">G7940-9001-02</a>	40 A	Black	PP	1.18	510	190	450	100	51	Yes	HB	

# Características das cadeias

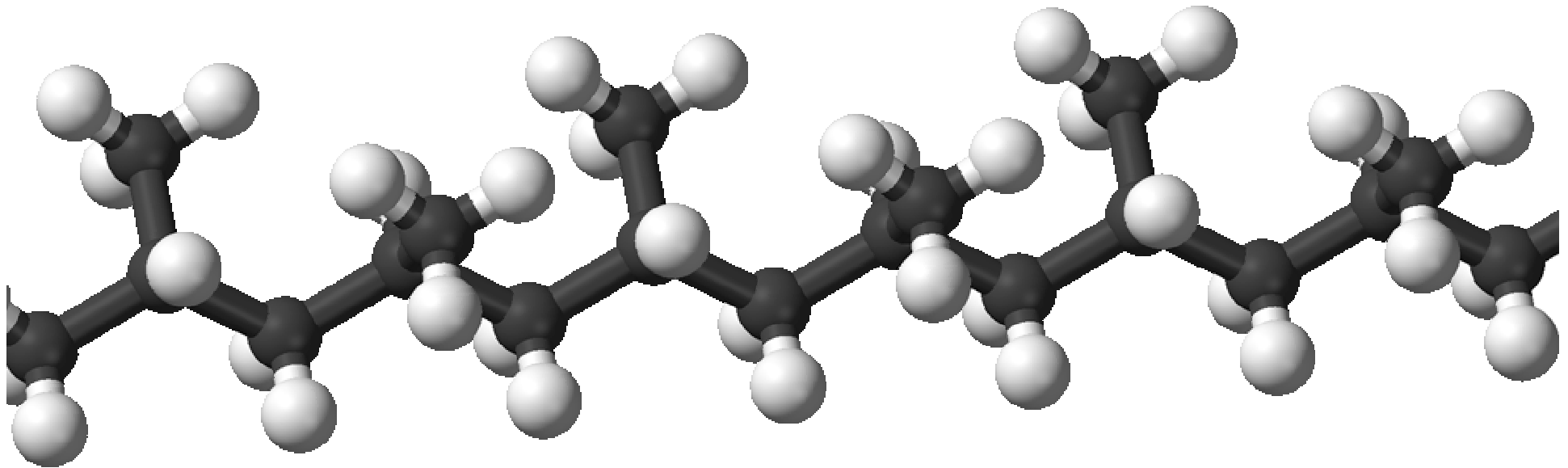
- Isomeria
  - Taticidade: iso-, sindio-, a-
  - Cis/trans
- Flexíveis ou rígidas
  - Monômero
  - Temperatura
  - Plastificantes
- Independentes ou conectadas
  - Entrelaçamento
  - Reticulação (vulcanização)
  - Separação de fases
  - Cristalização parcial

# Polipropileno isotático

- <http://commons.wikimedia.org/wiki/Image:Isotactic-polypropylene-plan-3D-balls.png>

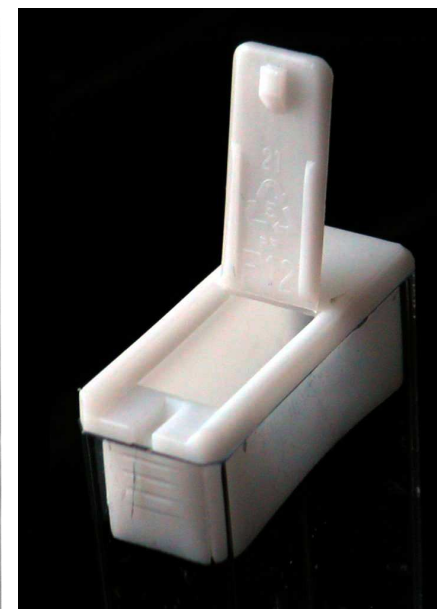
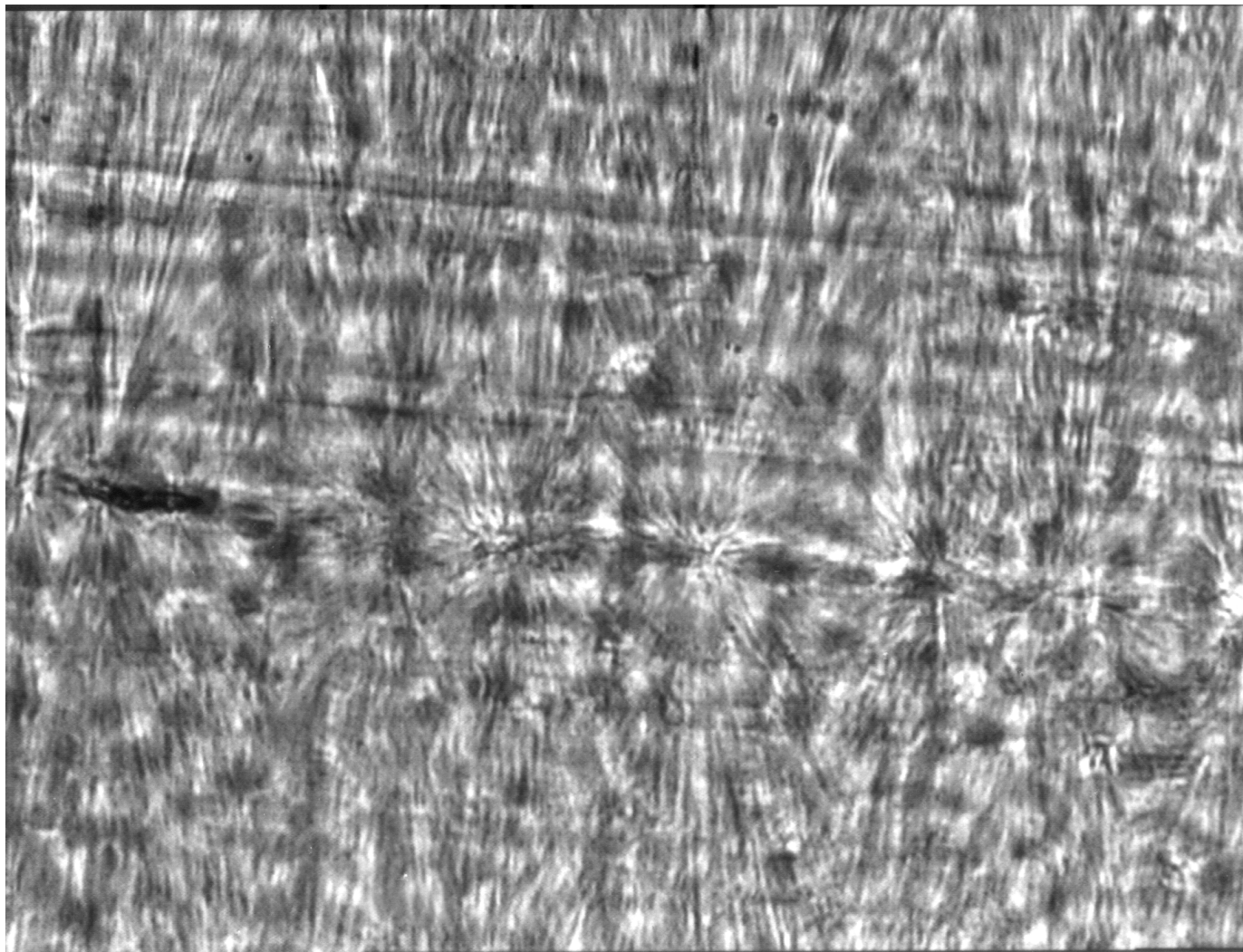


# Polipropileno sindiotático



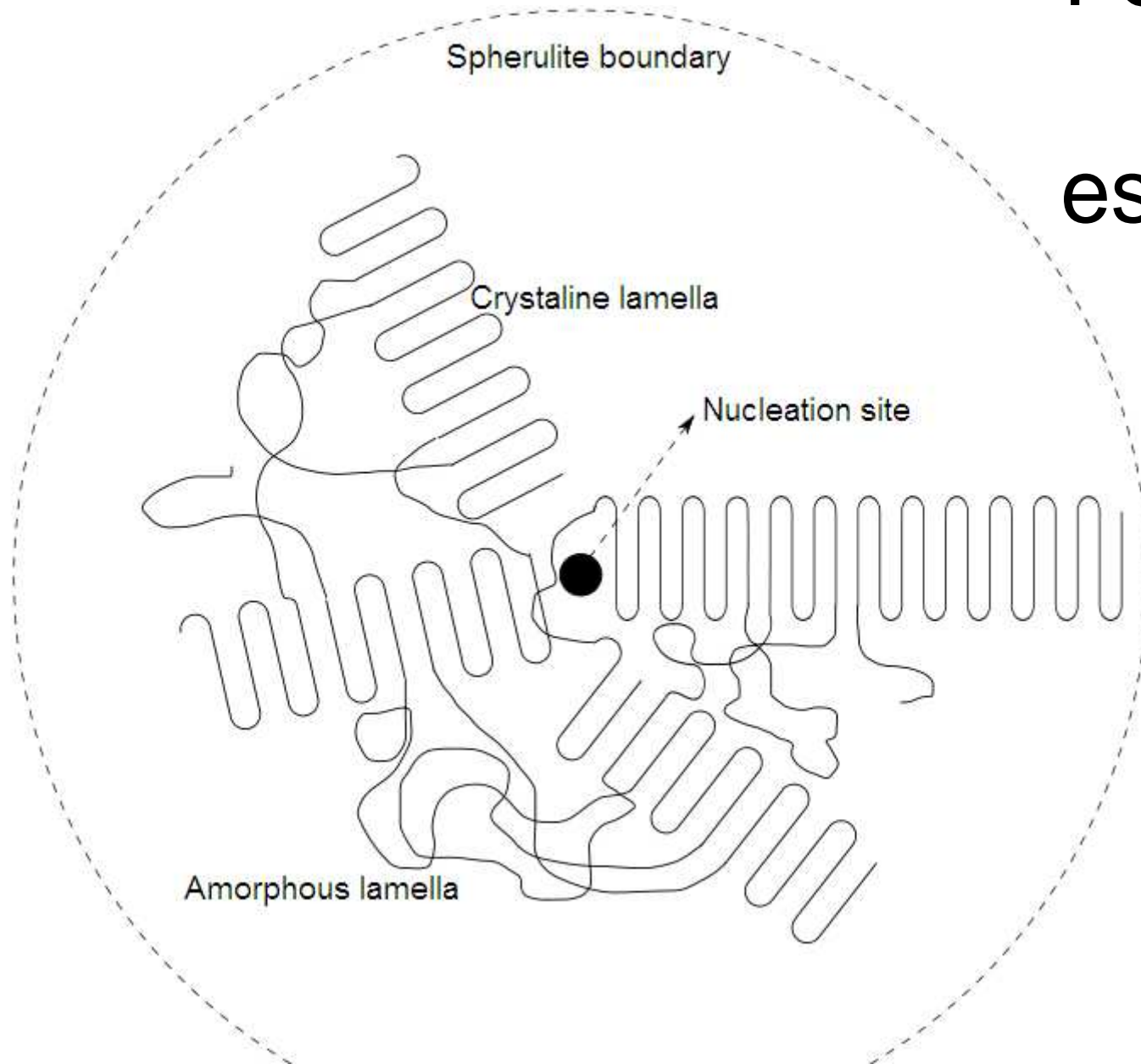


Polipropileno cristaliza: micrografia ótica em microscópio de luz polarizada. Polímero semicristalino, esferulitos.



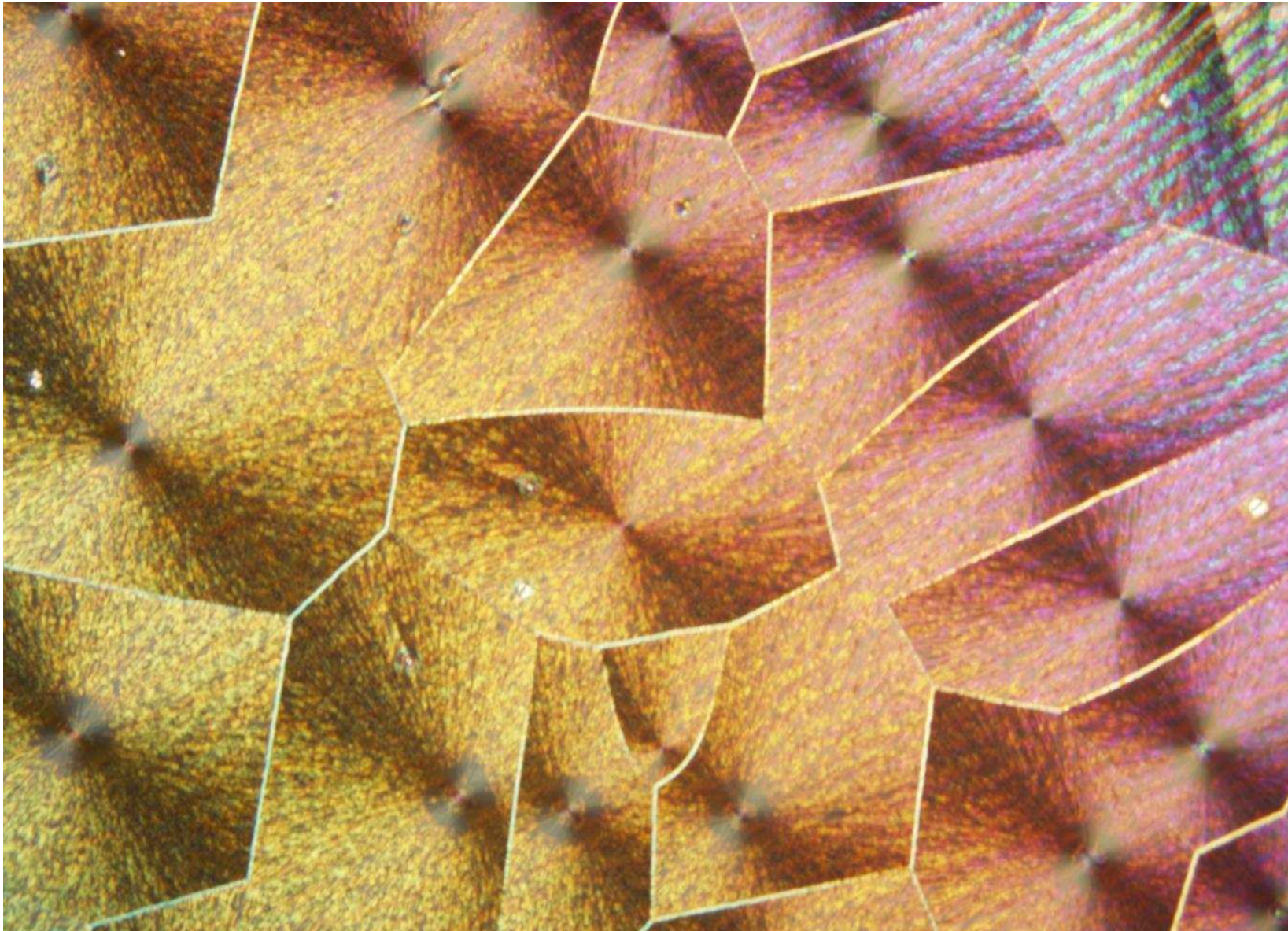
[http://en.wikipedia.org/wiki/Image:Polypropene\\_migrograph.png](http://en.wikipedia.org/wiki/Image:Polypropene_migrograph.png)

# Formação de esferulitos



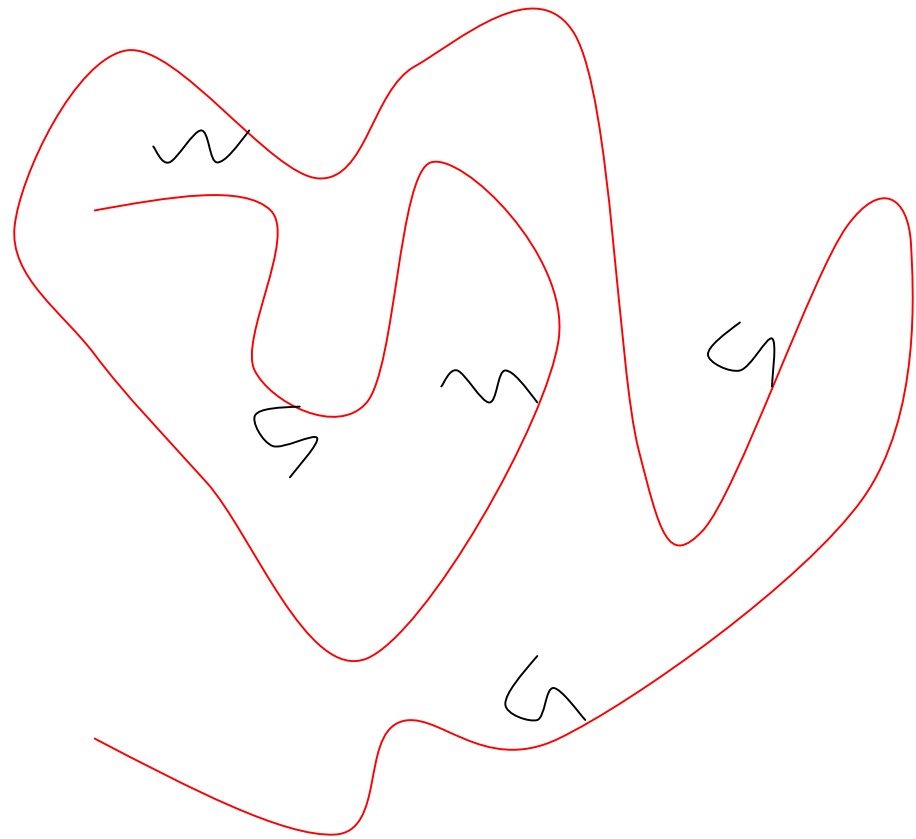


# PEO no microscópio de luz polarizada



# Enxertia

- Anidrido maleico em polipropileno
- Ácido acrílico em teflon
- Cadeias polares ligadas a cadeias apolares





# Enxertia de MMA em borracha natural



*Manufacturers of Custom  
Natural & Synthetic Latex Compounds,  
Adhesives & Rubber Chemical Emulsions*

Sunday March 25th 2007

## Heveatex Graft Polymer Products

**Heveatex Graft Polymers** are a unique series of products for the rubber industry. They are produced by grafting methyl methacrylate onto natural rubber latex. As such, they will exhibit a combination of elastomeric and plastic properties.

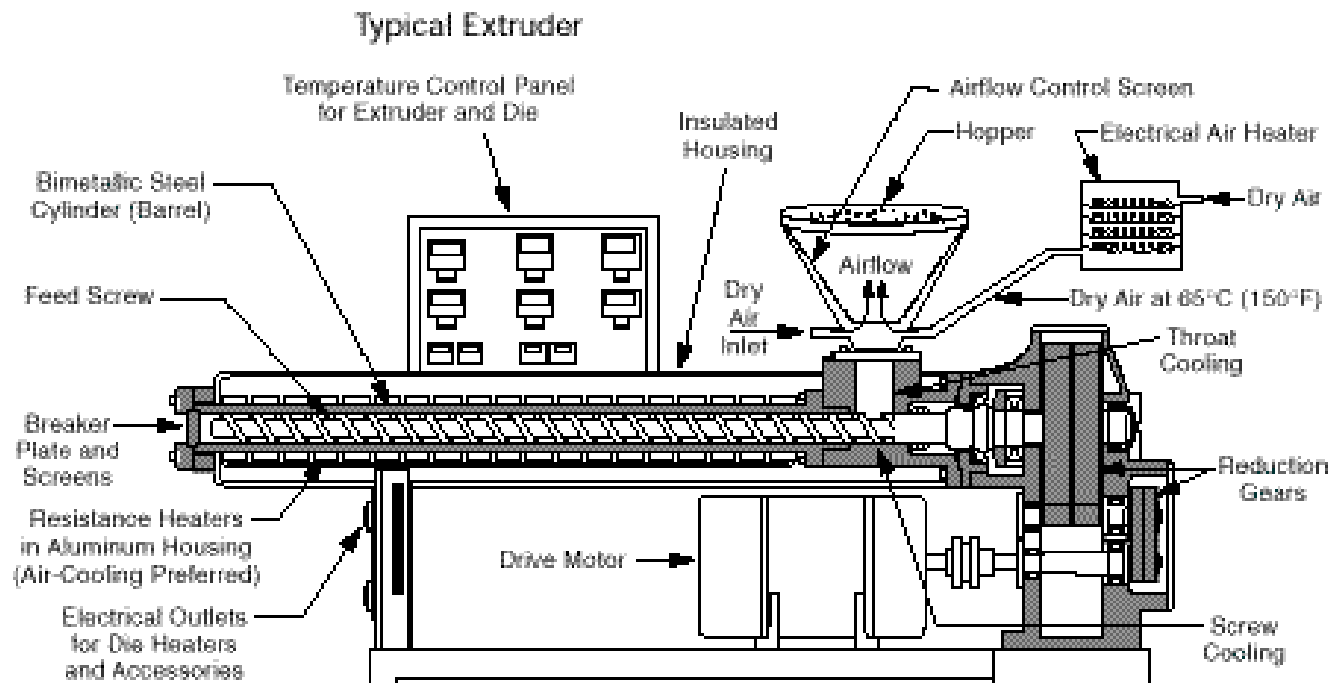
These products will yield strong adhesion between such dissimilar materials as natural and synthetic rubber, leather, polyvinyl chloride, textiles, and metals. Conventional pressure-sensitive natural rubber compounds can be tie-bonded to various plastic bases, particularly polyvinyl chloride and polypropylene. If the vinyl pyridine used in tire cord adhesives is replaced with graft polymer latex, superior adhesion can be obtained.

Three graft polymer latices are currently available. They differ only in rubber to methyl methacrylate ratio. They are compatible with a wide variety of emulsion polymers and latices. When compounding graft polymer latices, allowances should be made for calculating curative ingredient levels. A solid version is also available which can be made into solvent-based adhesives/primers.

Typical Properties				
Product Code	001320	001330	1330/40	08000
Physical Form	Latex	Latex	Latex	Milled Crepe
NR/MMA Ratio	80/20	70/30	70/30	50/50
Total Solids (%)	58.5	50	40	N/A
PH	10.5	10.5	10.5	N/A
Wt/Gallon (lbs)	8.10	8.30	8.20	N/A
Ingredients of the above are acceptable under 29 CFR as follows:				
Part 175.105	Yes	Yes	Yes	Yes
Part 175.300	No	Yes	Yes	No

Heveatex Corporation  
A Tillotson Company  
63 Water Street,  
P.O. Box 2760  
Fall River, MA 02721  
Tel: 508.675.0181 or  
Toll Free: 800.922.0078  
Fax: 508.677.0370  
www.heveatex.com

# Processamento reativo



- Os reagentes são injetados na massa de polímero fundido, em uma extrusora.
- Vantagens: excelente capacidade de mistura, controle de temperatura ótimo.

# Enxertia iniciada por chama (flambagem)

Inventores: S. Lee, R. Rengarajan

- U.S. Patent 5,571,869
- Polímero sólido é flambado (sua superfície é exposta a uma chama resultante da ignição de um gás com ar ou oxigênio, para produzir radicais livres).
- Monômeros vinílicos são postos em contacto com a superfície ativada pela chama, formando-se enxerto.
- Reação em fase sólida, em batelada ou contínua, não precisa de peróxidos, solventes ou radiação.
- Pode ser usada com PE, HDPE, PP, PS, PVC, PAN, PC, PI, PVAC, PVA, PU, polidienos, poliésteres.
- Vantagens
  - 1) eficiência energética (baixas temperaturas e pressões)
  - 2) não usa solventes nem reagentes ambientalmente problemáticos

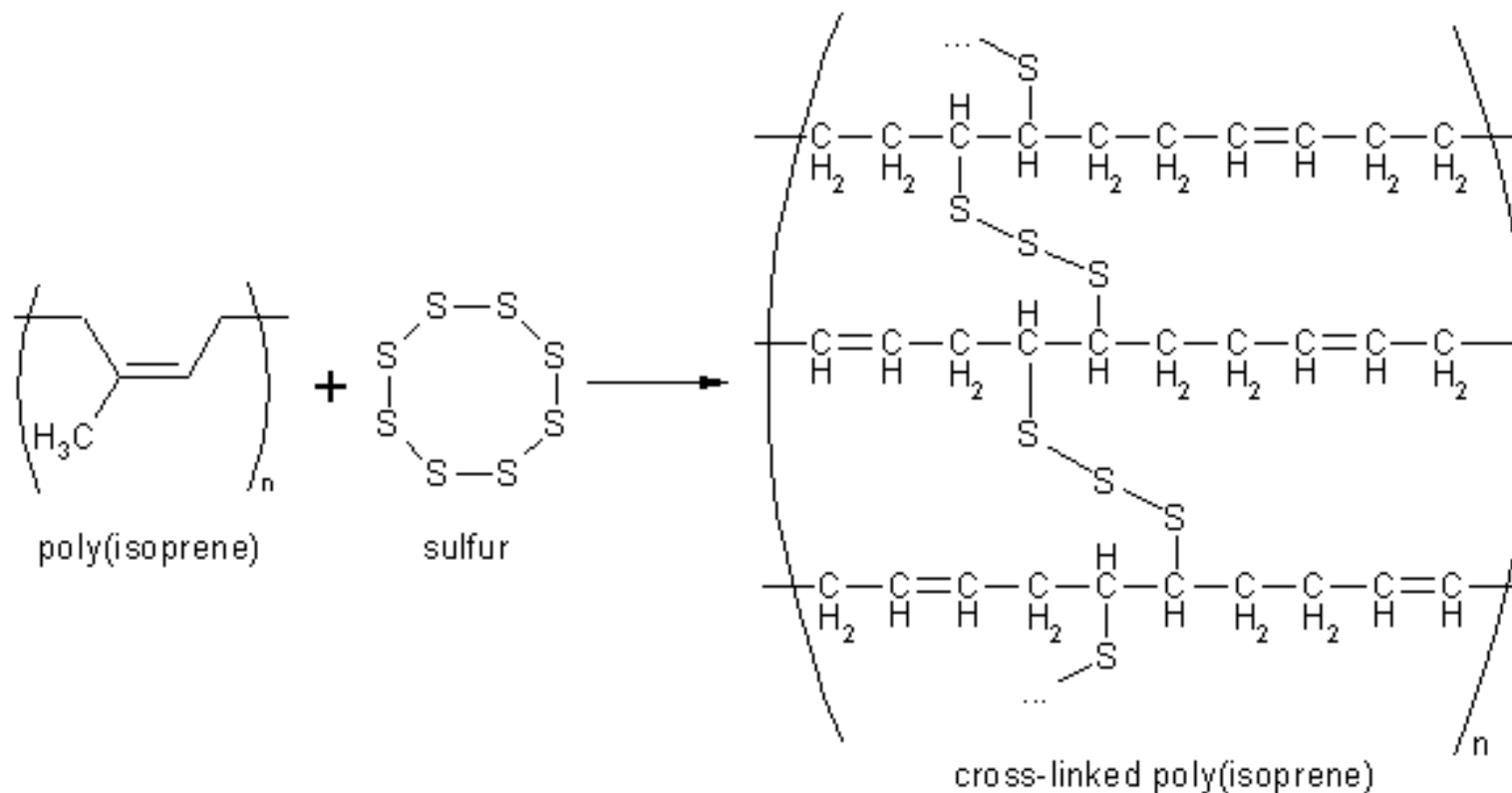
# Derivatização: celulose e amido

- Características
  - Hidroxilas reativas
  - Cristalinidade
- Derivados
  - Carboximetilcelulose (ácido cloroacético)
  - Metilcelulose (cloreto de metila)
  - Hidroxietilcelulose (cloroetanol)
  - Acetatos de celulose (anidrido acético)

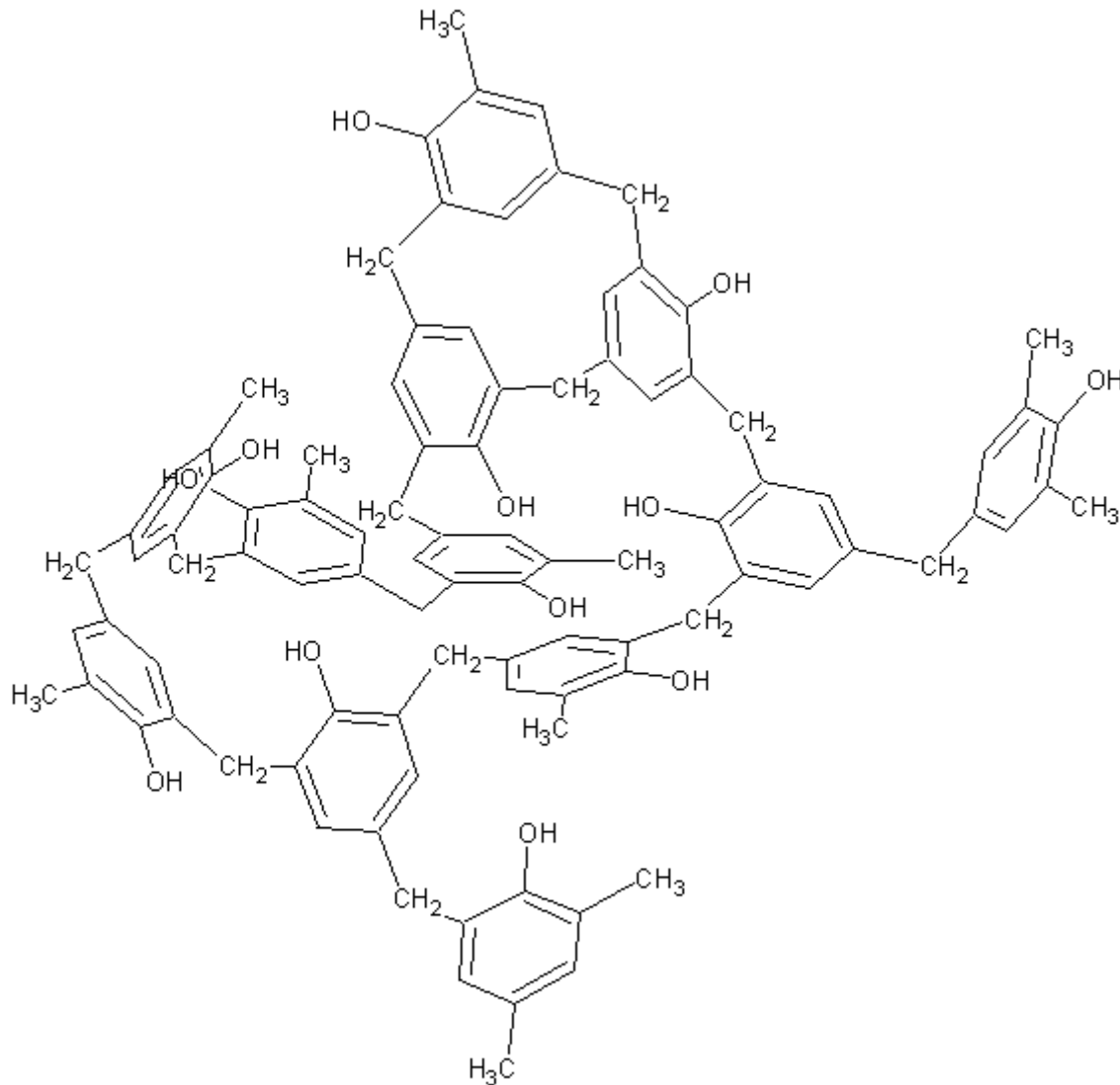


# Reticulação

- Vulcanização de borracha natural
- Descoberto por Goodyear



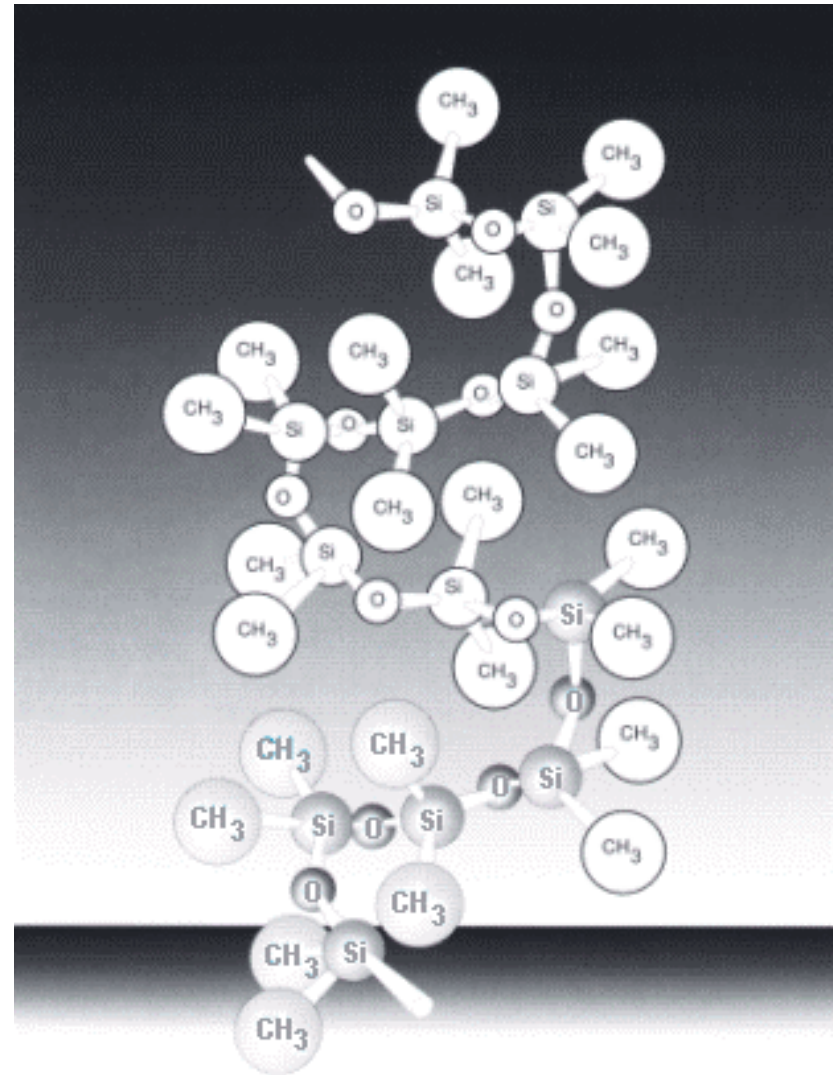
# Fenol-formol



- Em meio ácido:  
polímero linear  
(novolac)
- Em meio alcalino:  
reticulação

# Equilíbrio de polimerização

- Siliconas
- Polímeros e oligômeros cíclicos e lineares
- Oligômeros podem ser destilados de PDMS
- Reações de “cura” (healing):  
recomposição de defeitos mecânicos



# Consequências?

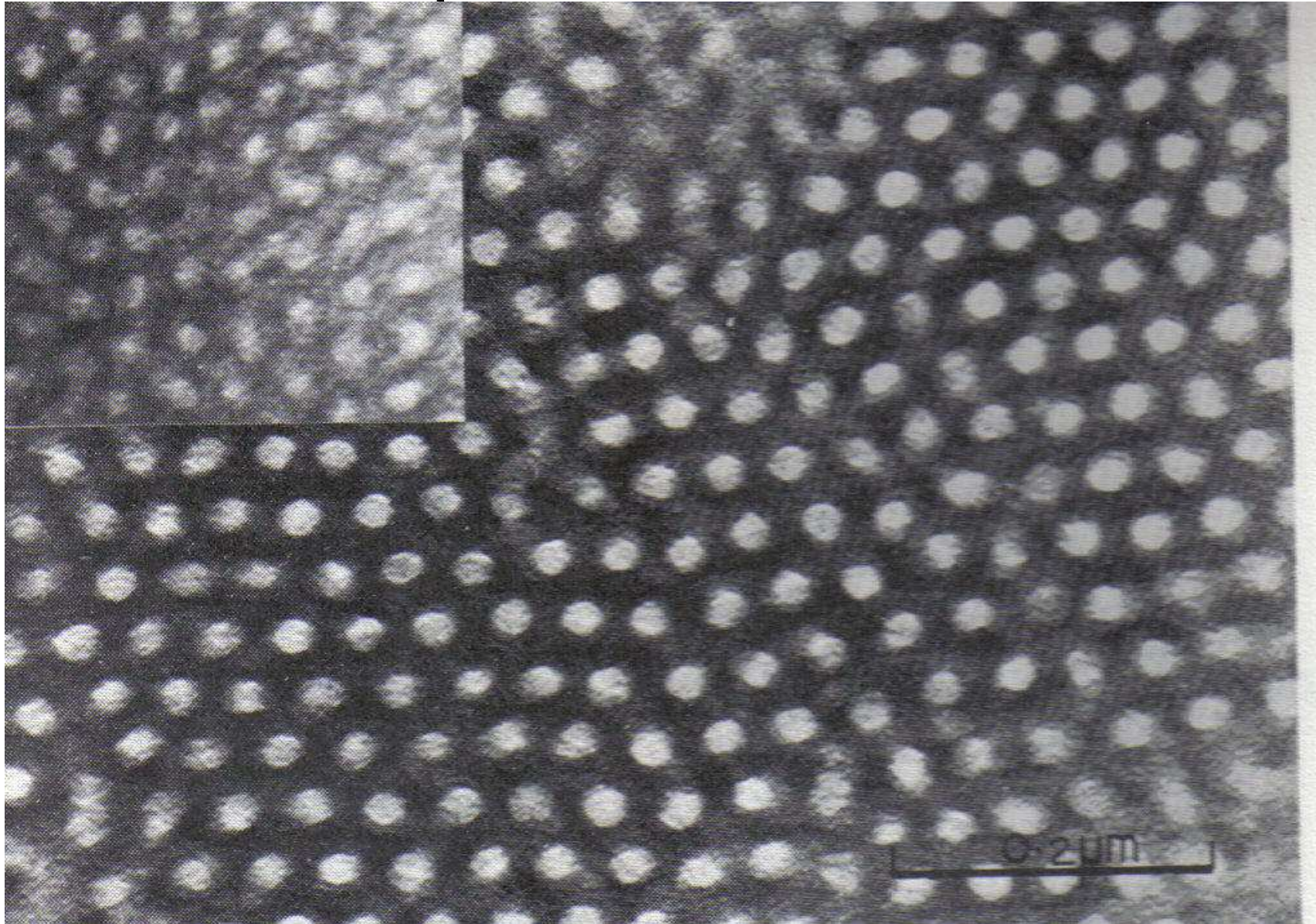
- **Safety of silicone breast implants**
- [http://books.nap.edu/catalog.php?record\\_id=9602](http://books.nap.edu/catalog.php?record_id=9602)
- Stuart Bondurant, Virginia Ernster, and Roger Herdman, Editors; Committee on the Safety of Silicone Breast Implants, Institute of Medicine
- **Description:**  
The Dow Corning case raised serious questions about the safety of silicone breast implants and about larger issues of medical device testing and patient education. **Safety of Silicone Breast Implants** presents a well-documented, thoughtful exploration of the safety of ...
- The committee concludes that there is convincing evidence that infants breast-fed by mothers with silicone gel breast implants receive no higher silicon intakes from breast milk than infants breast-fed by mothers without breast implants. Infants receiving cows' milk or commercial infant formula feedings are likely to have significantly higher silicon intakes than breast-fed infants. Evidence that any likely exposure to silicon or silicone has effects on infant health is lacking. The proportion, if any, of silicone in measurements of silicon in the samples discussed remains to be investigated. The oral toxicity of methylated siloxanes is very low, however, and these siloxanes are generally recognized as safe (for oral exposure) by the Food and Drug Administration (FDA) when used as indirect food additives as reviewed in Chapter 4 of this report (D. Benz, FDA, personal communication, 1998). Breast Implants and Problems with Breast Feeding

# Elastômeros termoplásticos

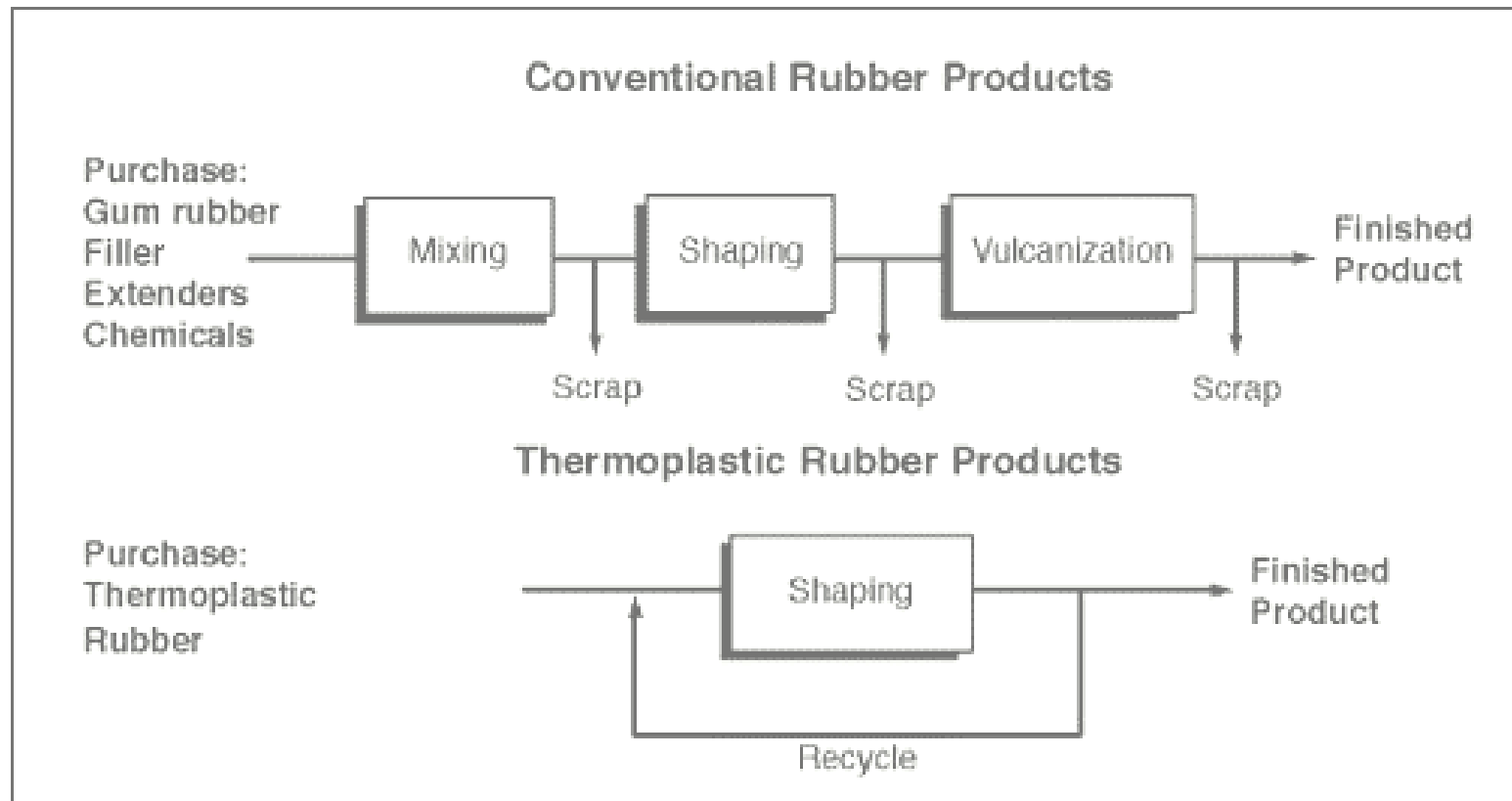
- Materiais flexíveis, com módulo de Young baixo
- Estirados até o dobro do seu comprimento original, recuperam a dimensão original quando relaxados.
- Várias famílias, substituem borrachas termofixas em escala crescente.
- Usados para modificarem poliolefinas, aumentando resistência ao impacto.



# Micrografia eletrônica de elastômero termoplástico estirênico



# Vantagens de fabricação e reciclagem



# Monômeros de origem natural

- Properties of lactic acid based polymers and their correlation with composition Anders Södergård, Progress in Polymer Science 27, 2002, 1123-1163
- Propriedades e estrutura de polímeros baseados no ácido láctico.
- Polímeros obtidos por policondensação, polimerização com abertura de cadeia, extensão de cadeia e enxertia.
- Produtos modificados por reações pós-polimerização (peróxido, processamento por radiação).
- Derivados de D,D-lactida e L,L-lactida, glicólido (GA), epsilon-caprolactona (CL), carbonato de trimetileno (TMC), 1,5-dioxepan-2-ona (DXO) e outros análogos cíclicos.