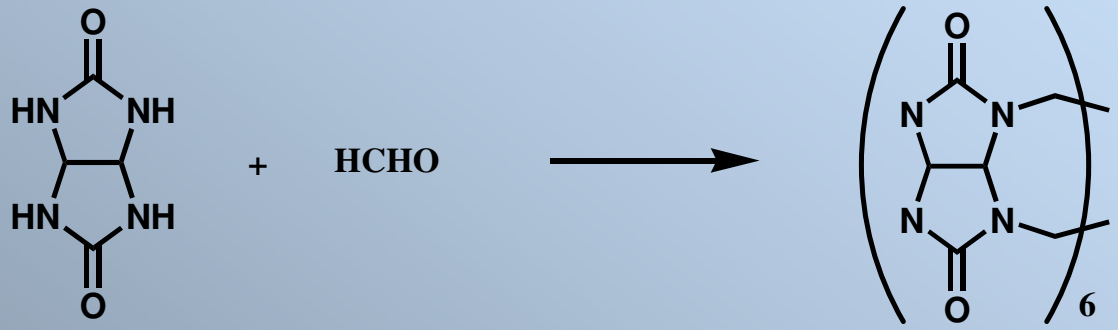
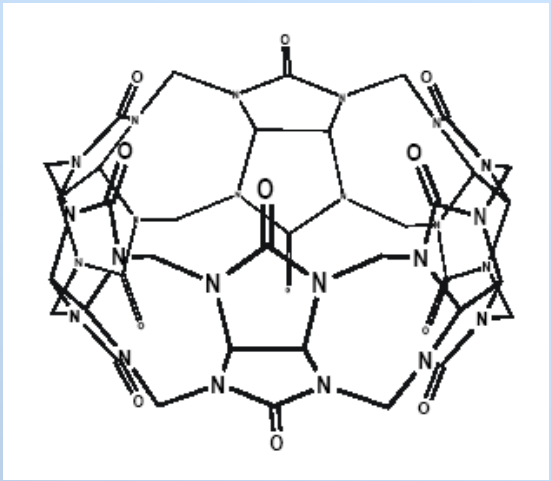
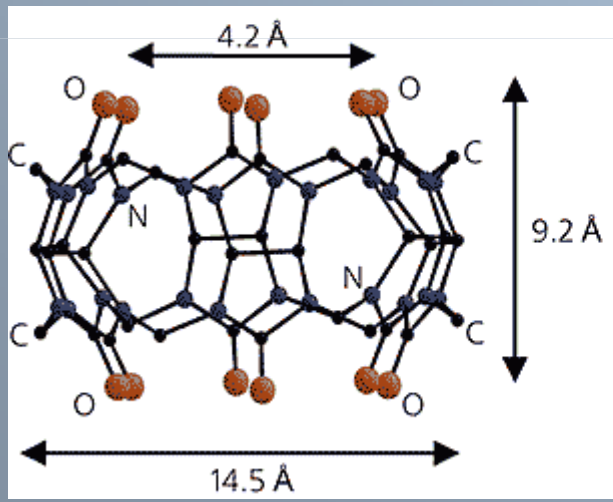
Супрамолекулярная Химия (лекция 6)

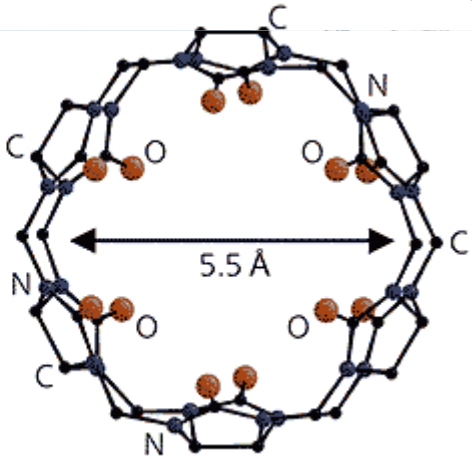
К.х.н. Вадим К. Хлесткин

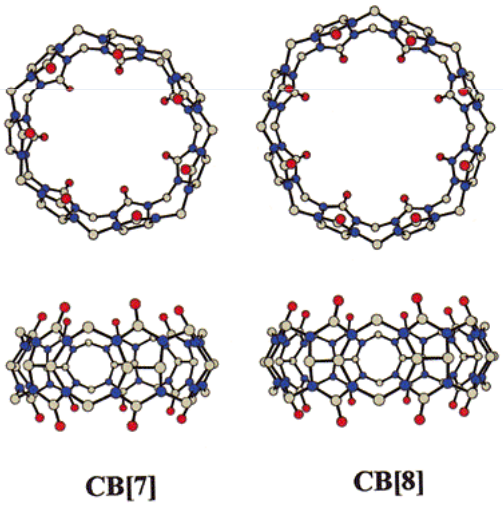
Кукурбитурил







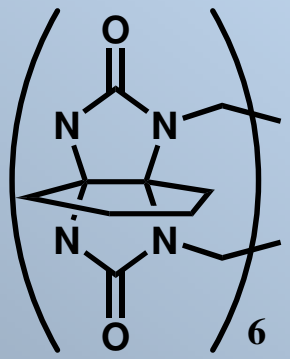


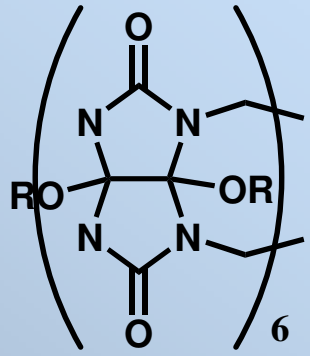


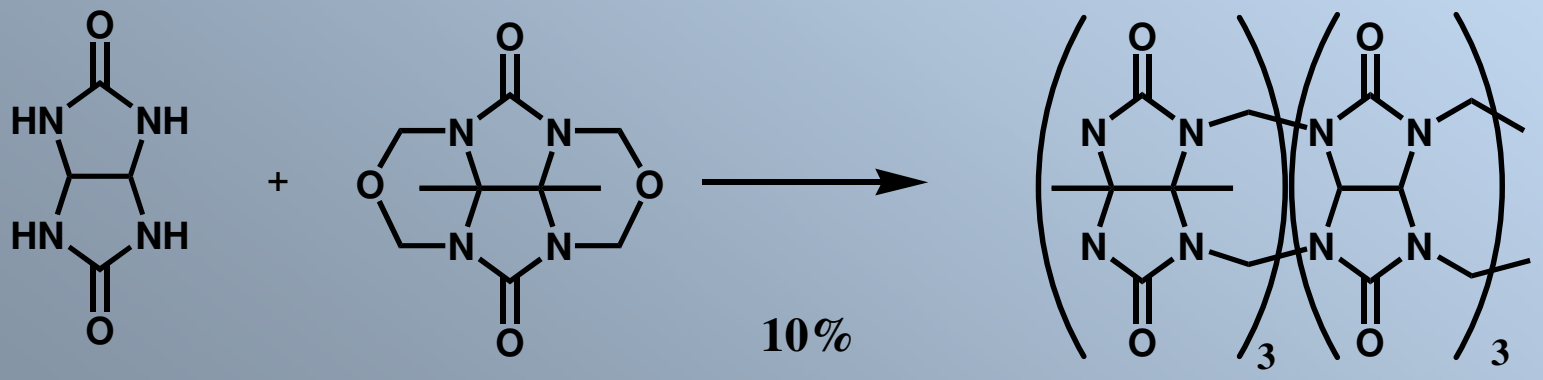
Кукурбитурил

Dodecahydro-1H, 4H, 14H, 17H-2, 16:3, 15-dimethano-5H, 6H, 7H, 8H, 9H, 10H, 11H, 12H, 13H, 18H, 19H, 20H, 21H, 22H, 23H, 24H, 25H, 26H-2, 3, 4a, 5a, 6a, 7a, 8a, 9a, 10a, 11a, 12a, 13a, 15, 16, 17a, 18a, 19a, 20a, 21a, 22a, 23a, 24a, 25a, 26a-tetracosaazabispentaleno[1’’’, 6’’’:5’’, 6’’, 7’’]cycloocty[1’’, 2’’, 3’’:3’, 4’]pentaleno(1’, 6’:5, 6, 7)-cycloocta(1, 2, 3-gh:1’, 2’, 3’-g’h’)cycloocta(1, 2, 3-cd:5, 6, 7-c’d’)dipentalene-1, 4, 6, 8, 10, 12, 14, 17, 19, 21, 23, 25-dodecone

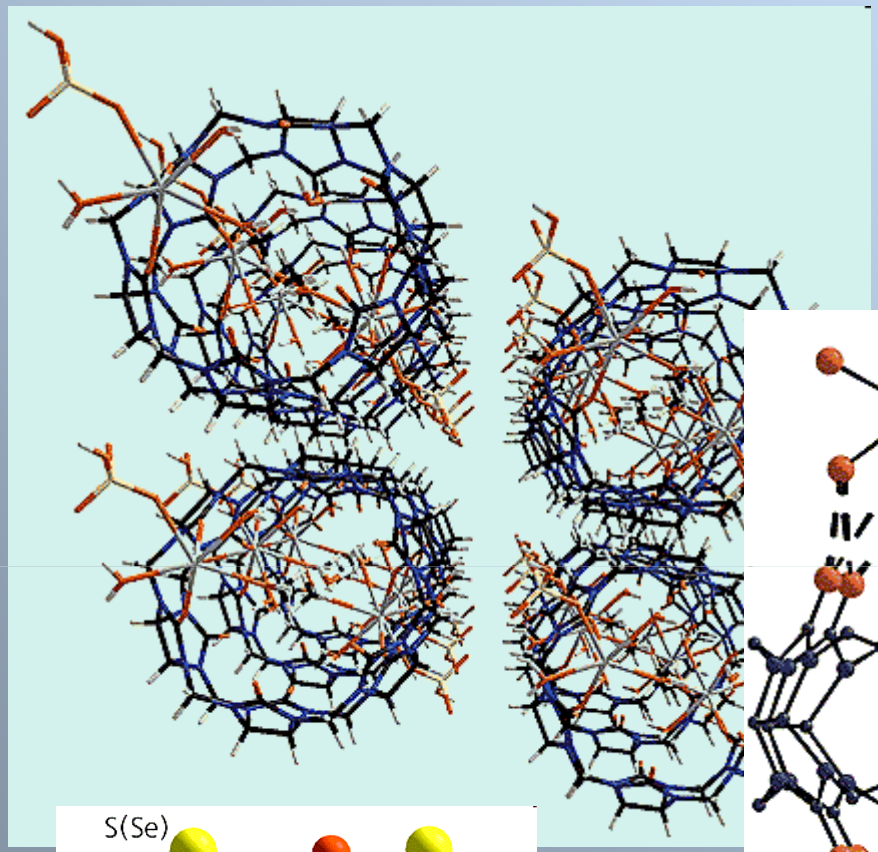
Модификация кукурбитурила

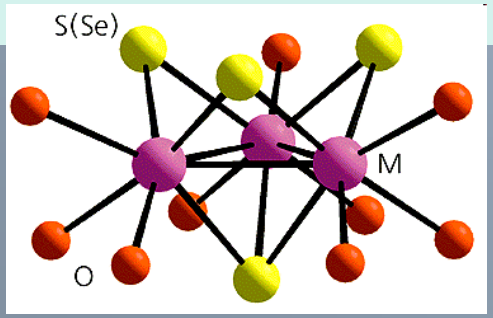


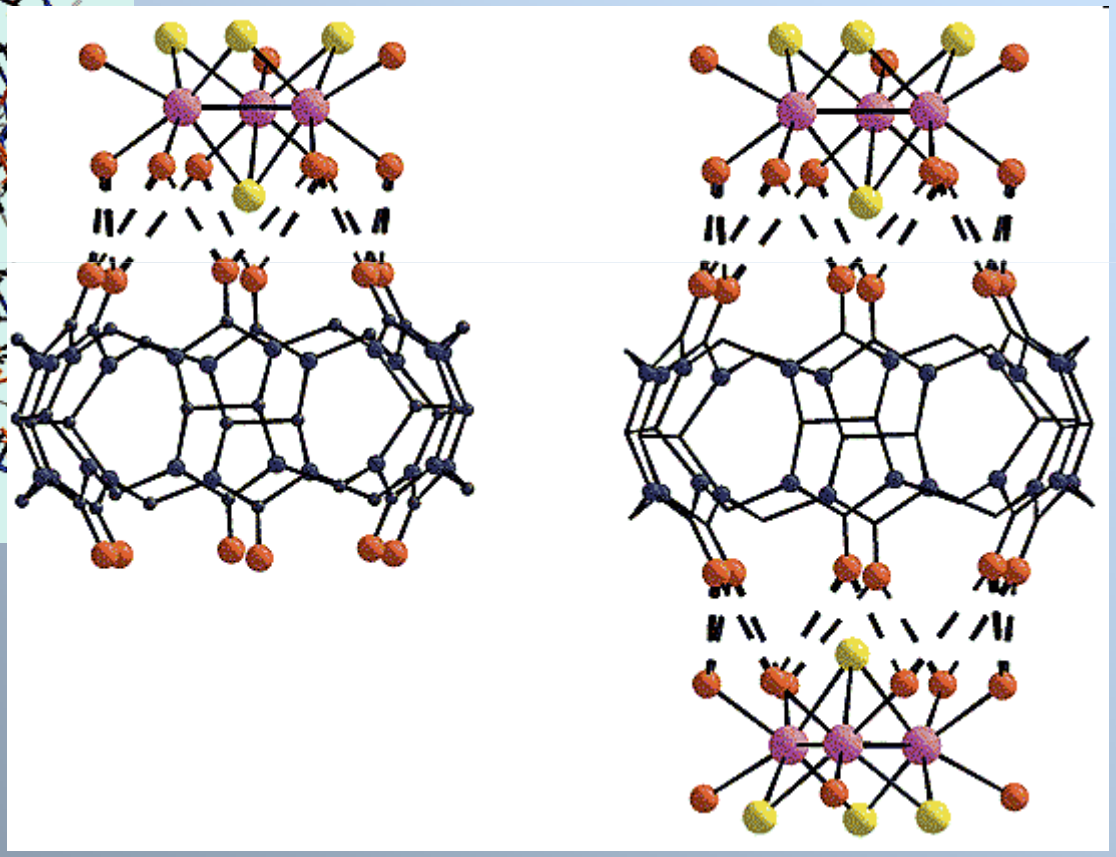




Комплексы кукурбитурила

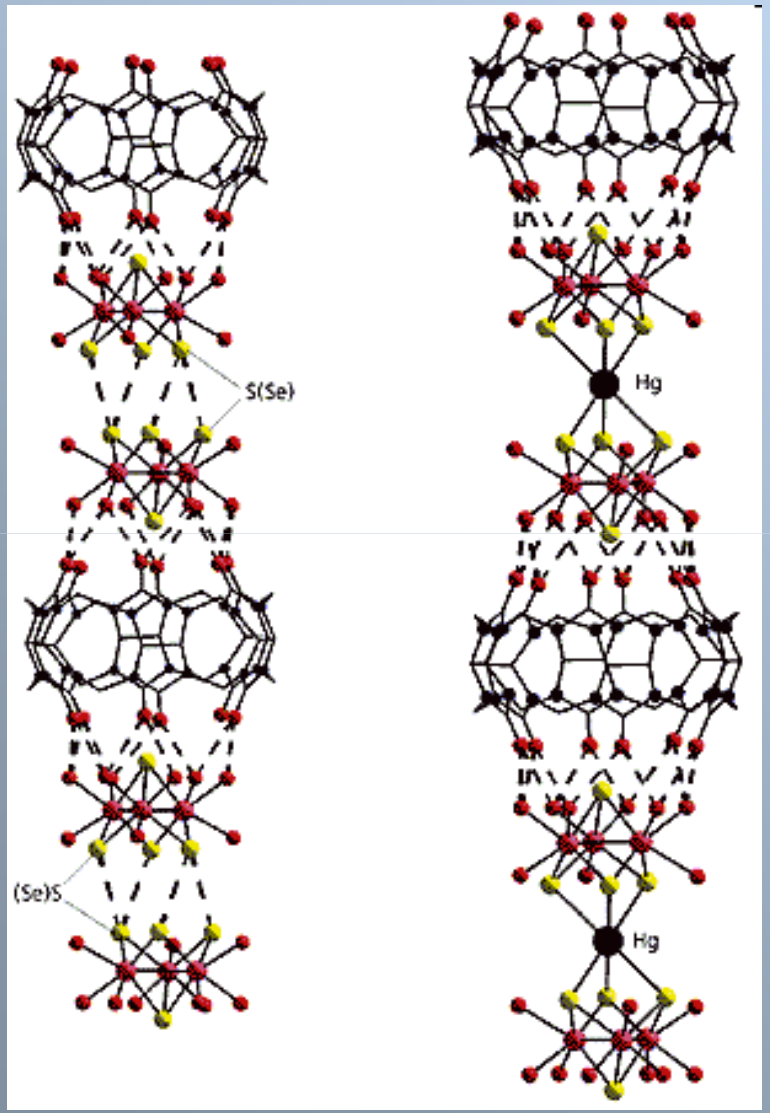


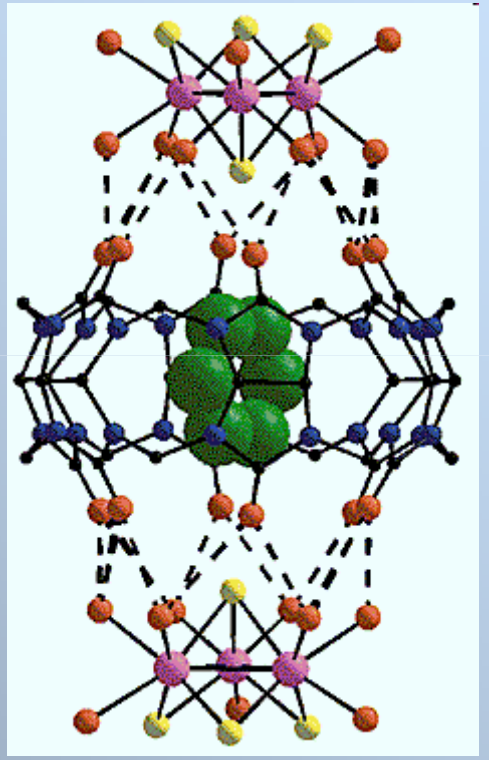




В.П.Федин, О.А.Герасько, Природа, 2002, №8

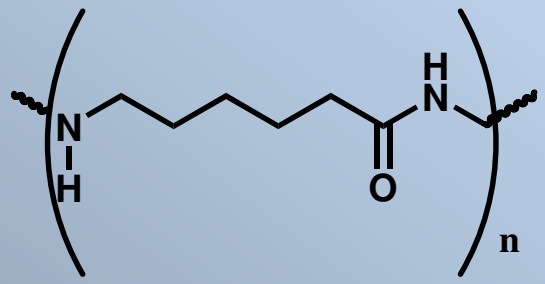
Комплексы кукурбитурила - 2

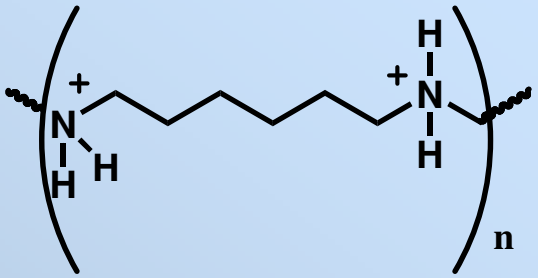




В.П.Федин, О.А.Герасько, Природа, 2002, №8

Комплексы кукурбитурила - 3





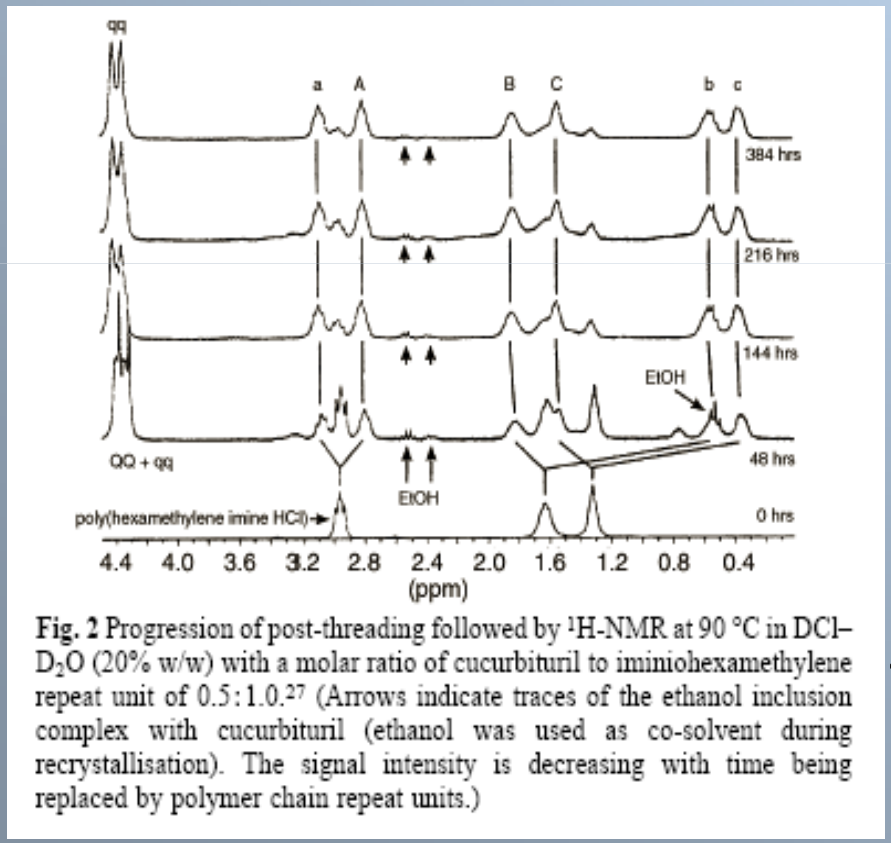
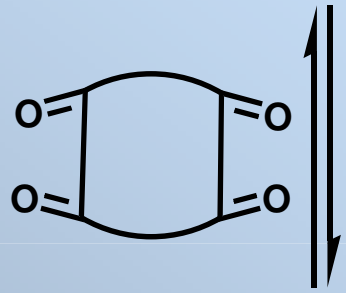
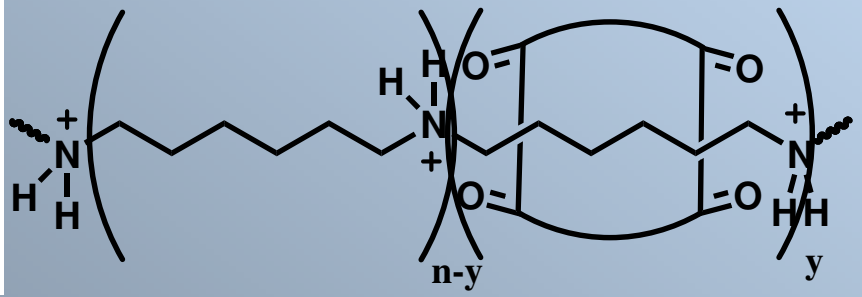


Fig. 2 Progression of post-threading followed by ^{1}H-NMR at 90 °C in DCl–D_2O (20% w/w) with a molar ratio of cucurbituril to iminiohexamethylene repeat unit of 0.5:1.0.[27] (Arrows indicate traces of the ethanol inclusion complex with cucurbituril (ethanol was used as co-solvent during recrystallisation). The signal intensity is decreasing with time being replaced by polymer chain repeat units.)



DCl - D_2O (20%)
r.t., 100%



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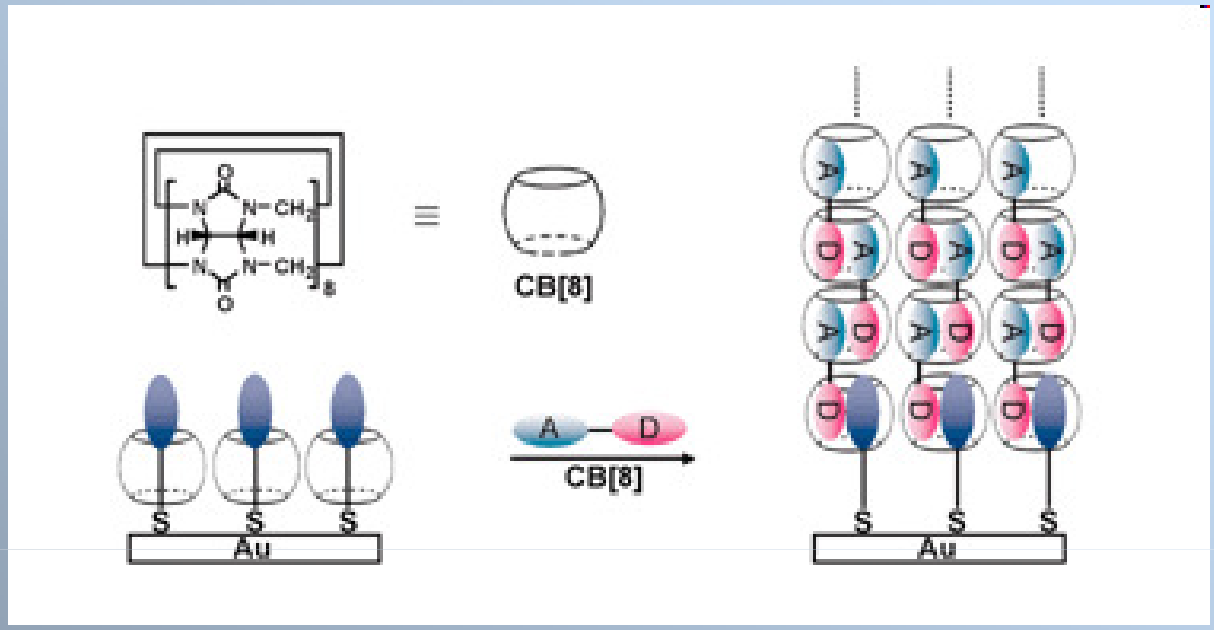

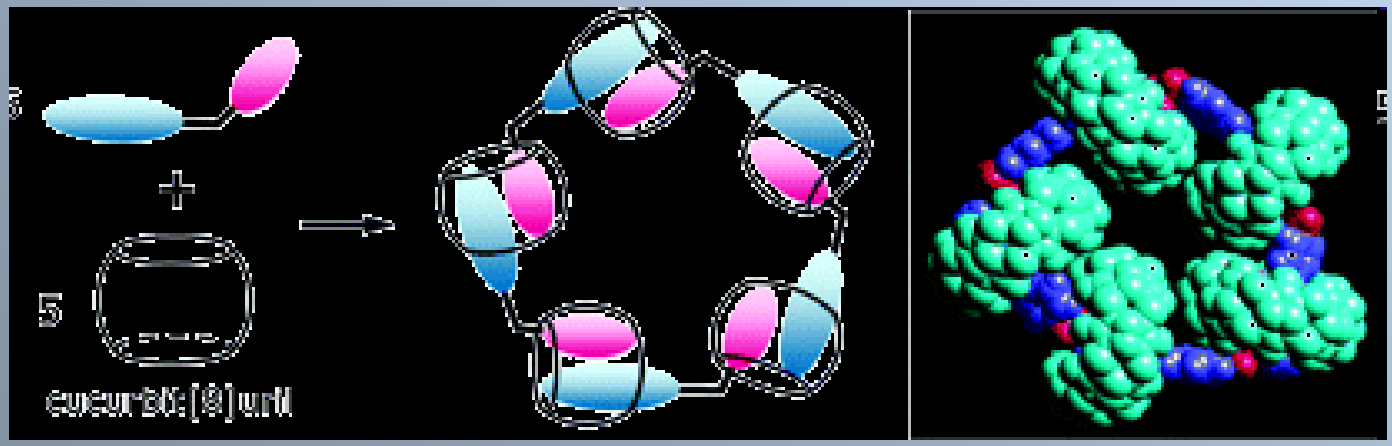

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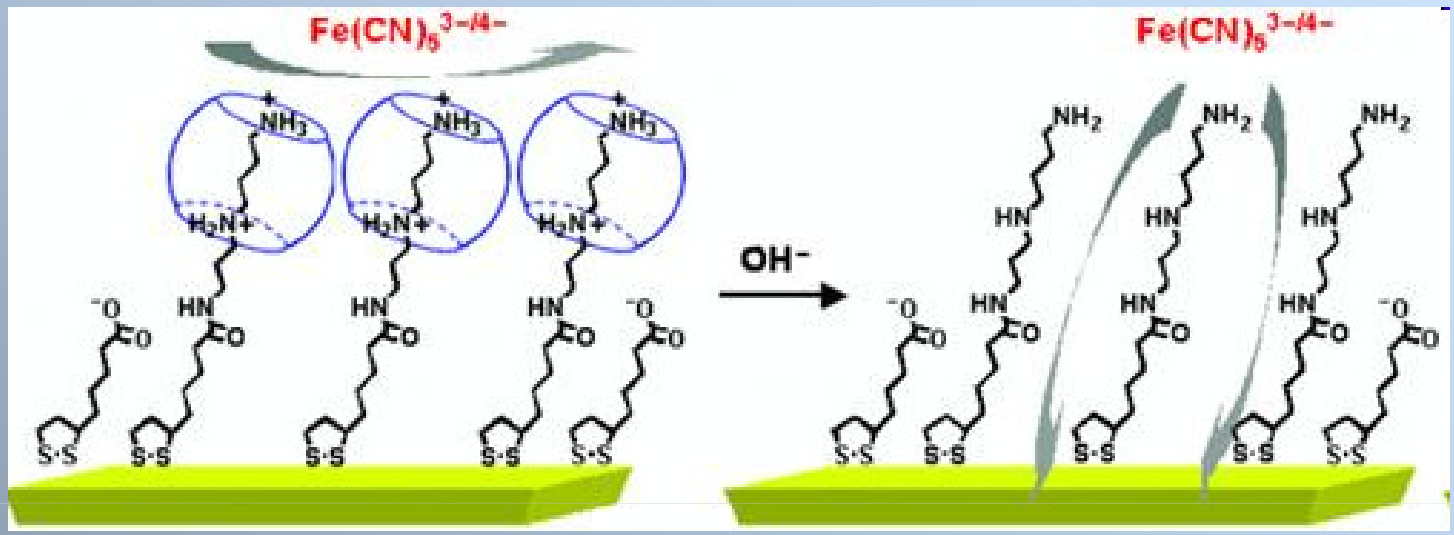
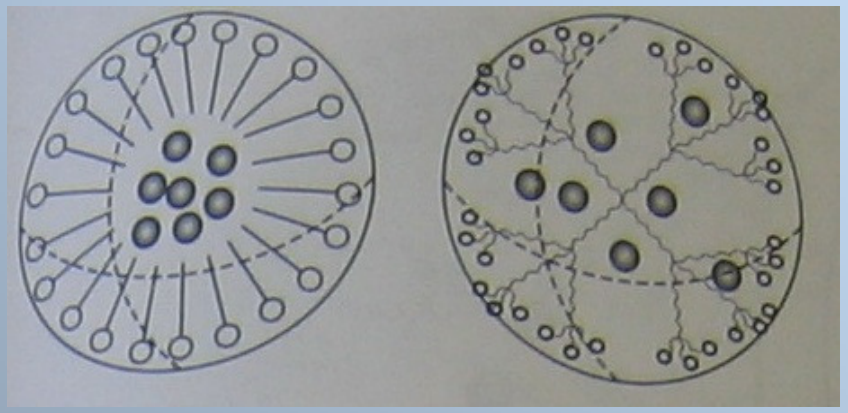
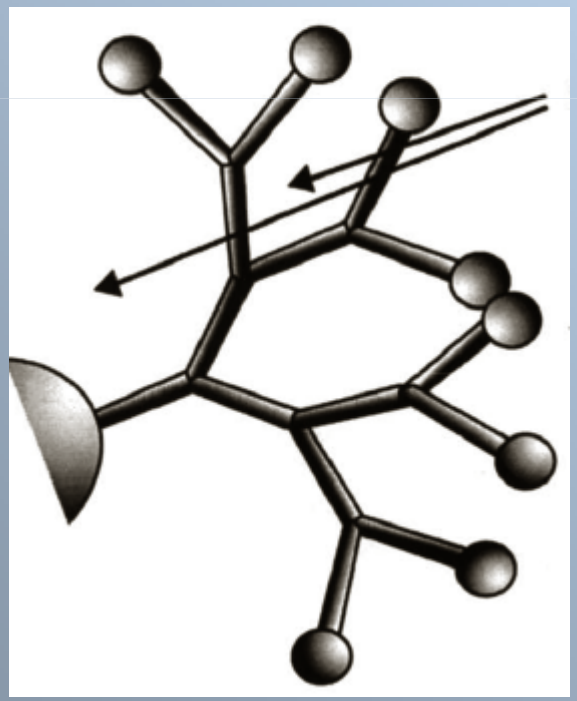


Дендримеры



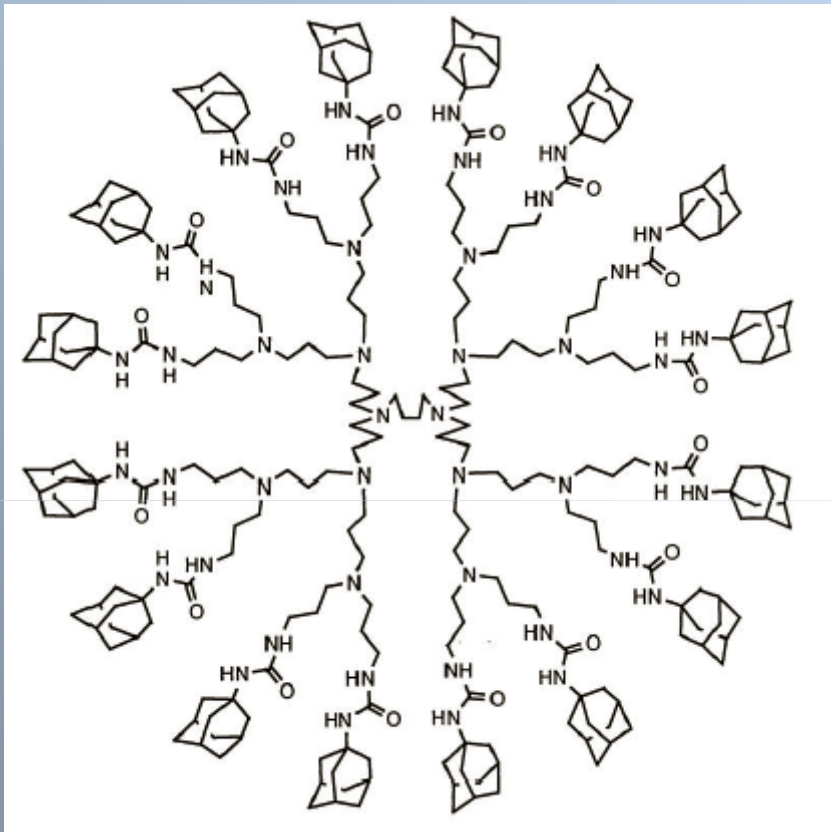


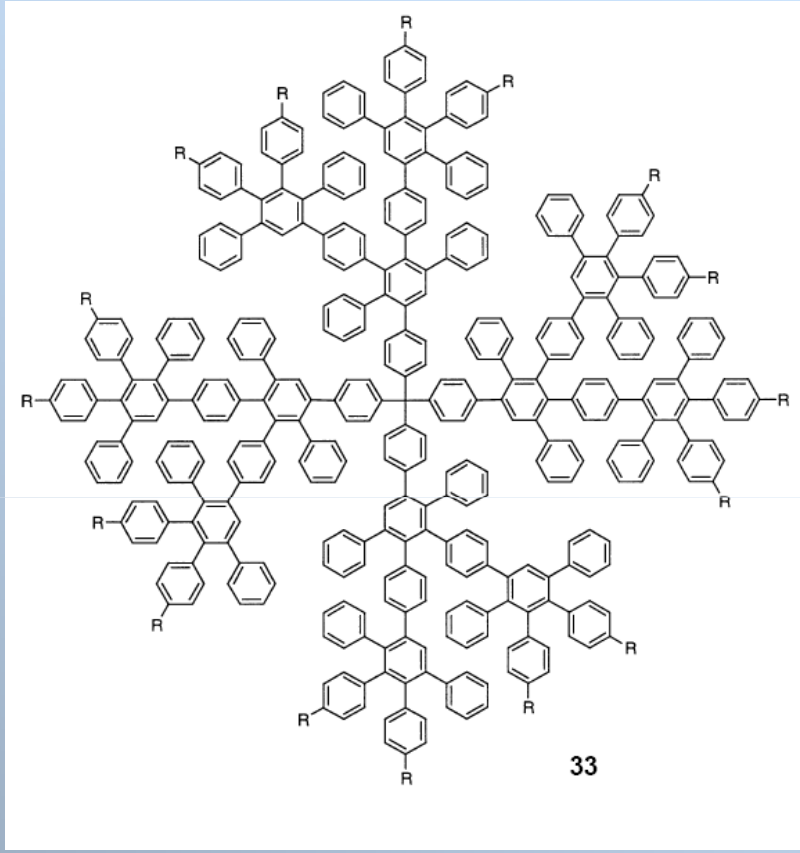
Остов

Внутренние полости, которые могут быть заселены молекулами «гостя».

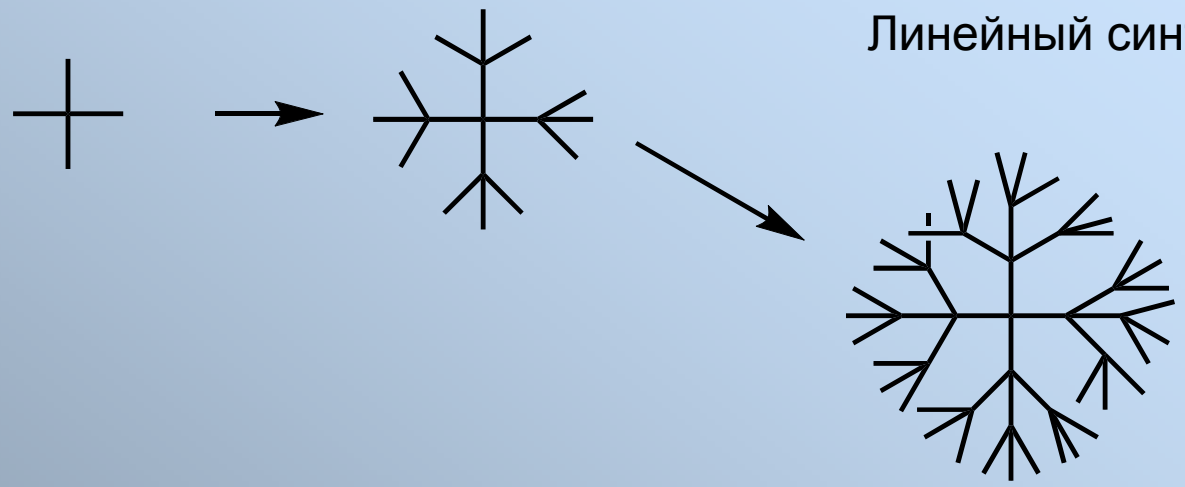
Концевые группы.

Дендримеры

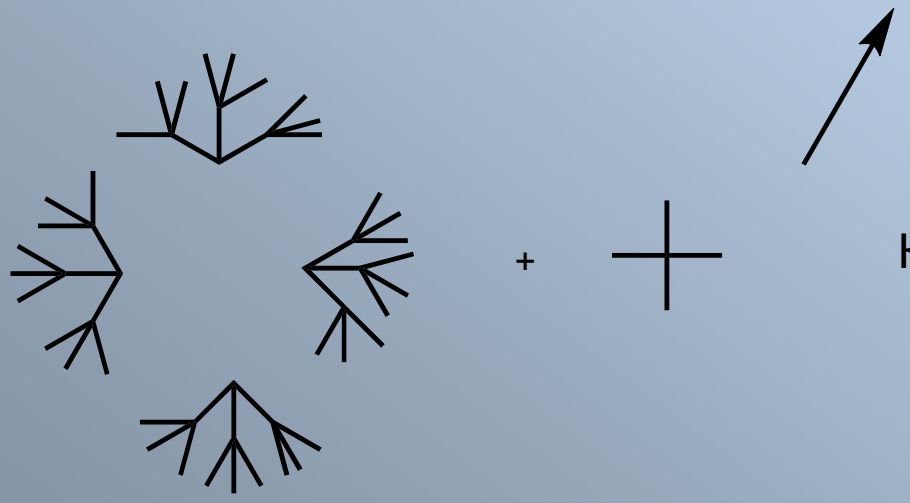




Подходы к синтезу дендримеров



Линейный синтез



Конвергентный синтез

Дендримеры

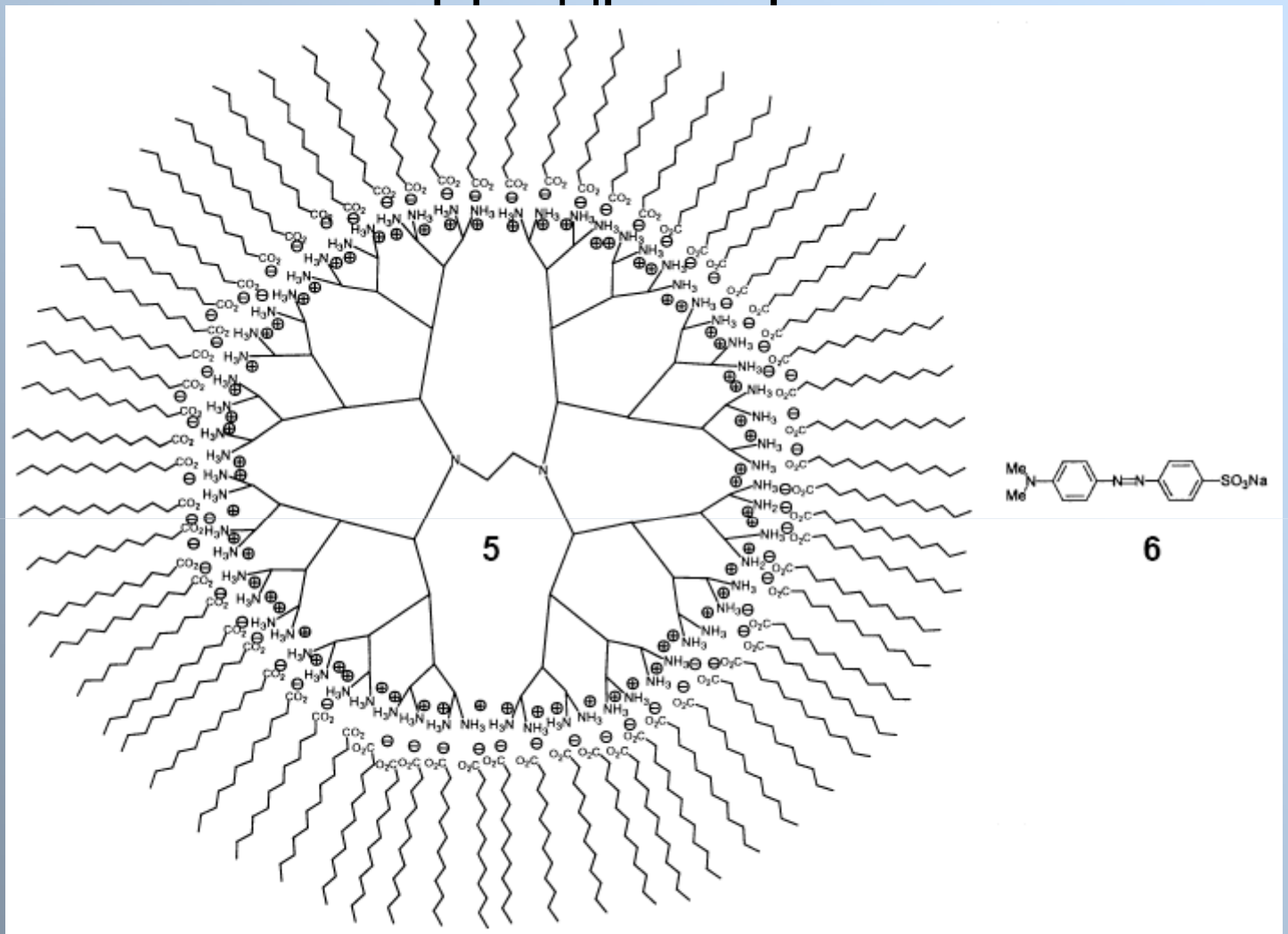
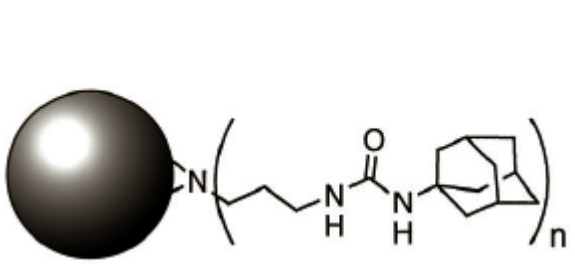
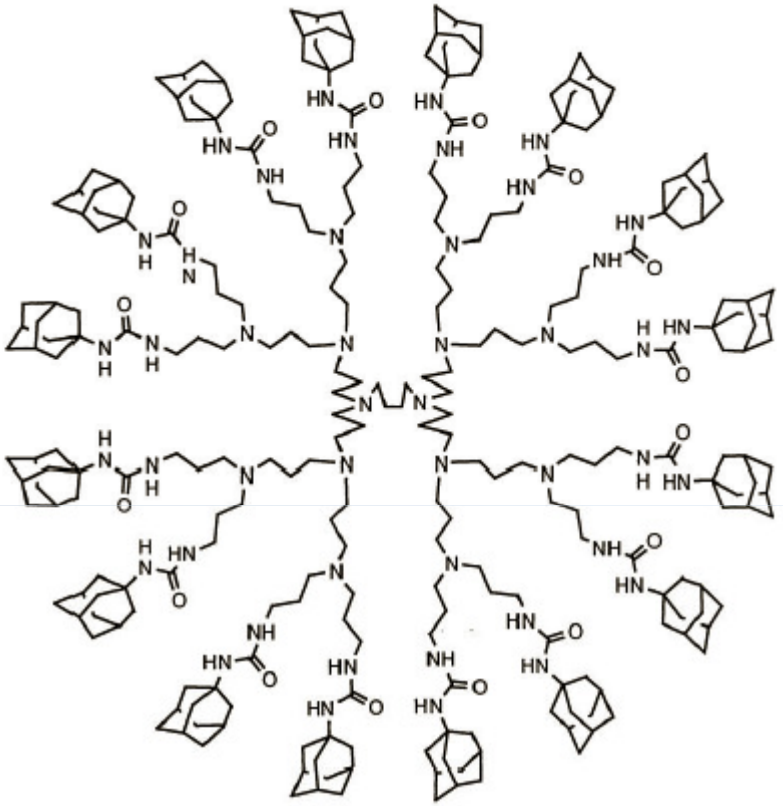


Fig. 3. Ionic assembly of PAMAM dendrimer and decanoic acid (5) studied by Crooks and co-workers. In water the assembly is capable of complexing methyl orange (6)

Дендримеры



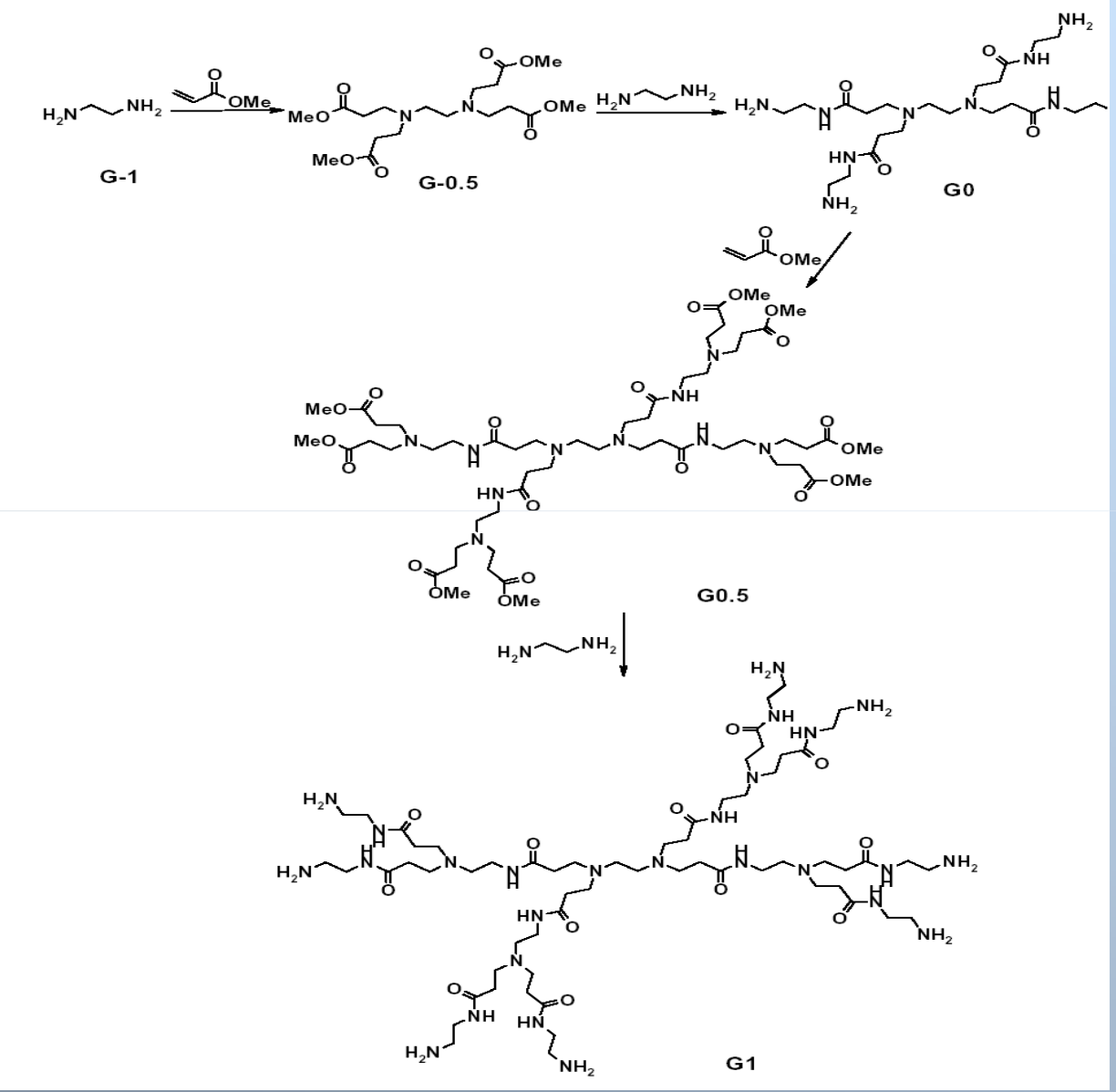
n	compd no.
4	**24a**
8	**24b**
16	**24c**
32	**24d**
64	**24e**



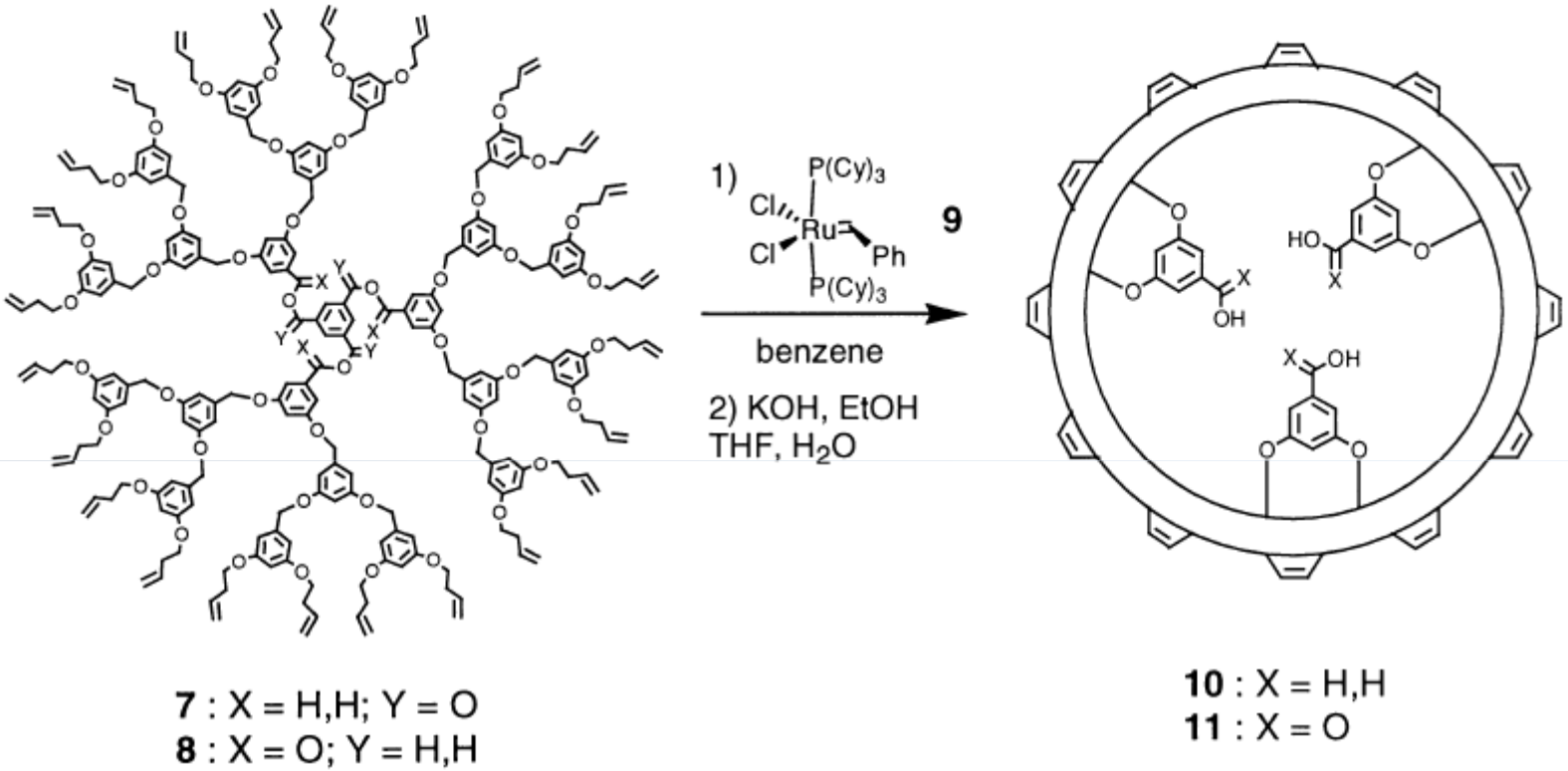
24c

Fig. 7. Adamantane-tipped PPI dendrimers developed by Meijer and Reinhoudt, complex multiple β-cyclodextrin units in water

PAMAM - Дендример



Дендримеры

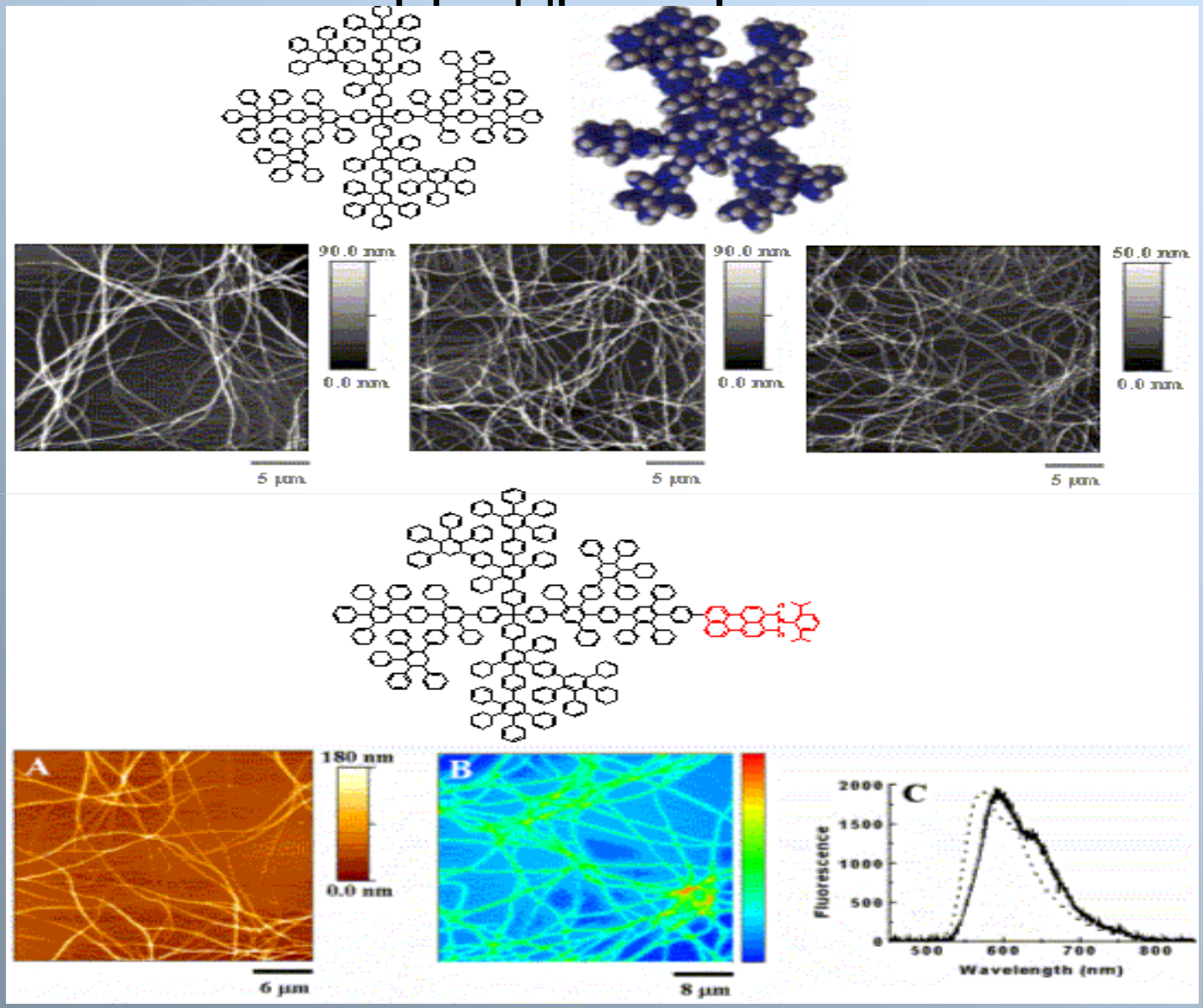


7 : X = H,H; Y = O
8 : X = O; Y = H,H

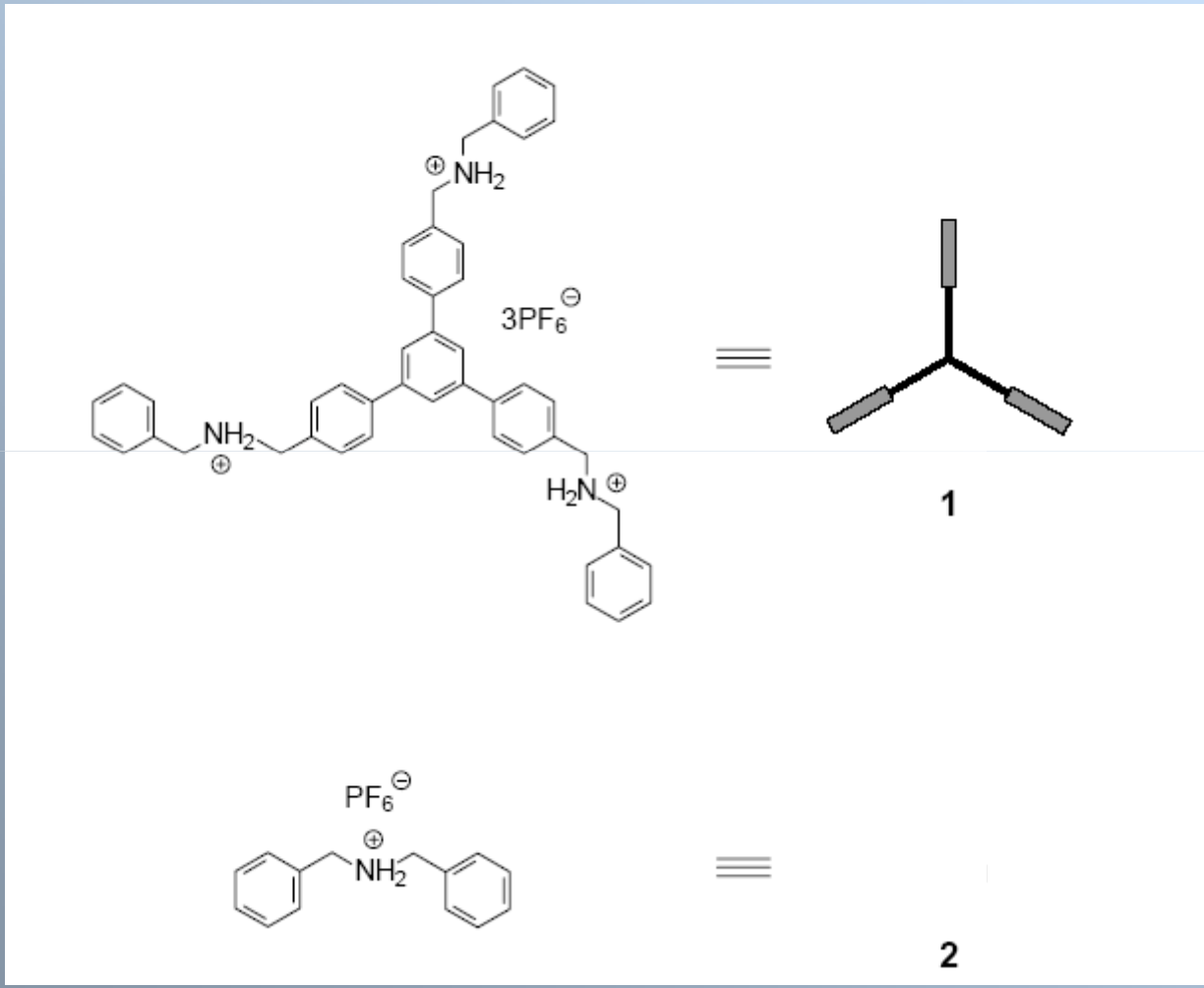
10 : X = H,H
11 : X = O

Scheme 1. Wendland and Zimmerman process for "coring" dendrimers. Cross-linking with the ring closing metathesis reaction is followed by basic hydrolysis/alcoholysis which removes the core unit

Дендримеры


90.0 nm
0.0 nm
5 μm
90.0 nm
0.0 nm
5 μm
50.0 nm
0.0 nm
5 μm
A
180 nm
0.0 nm
6 μm
B
8 μm
C
Fluorescence
2000
1500
1000
500
0
500
600
700
800
Wavelength (nm)

Самосборка супрамолекулярных дендримеров



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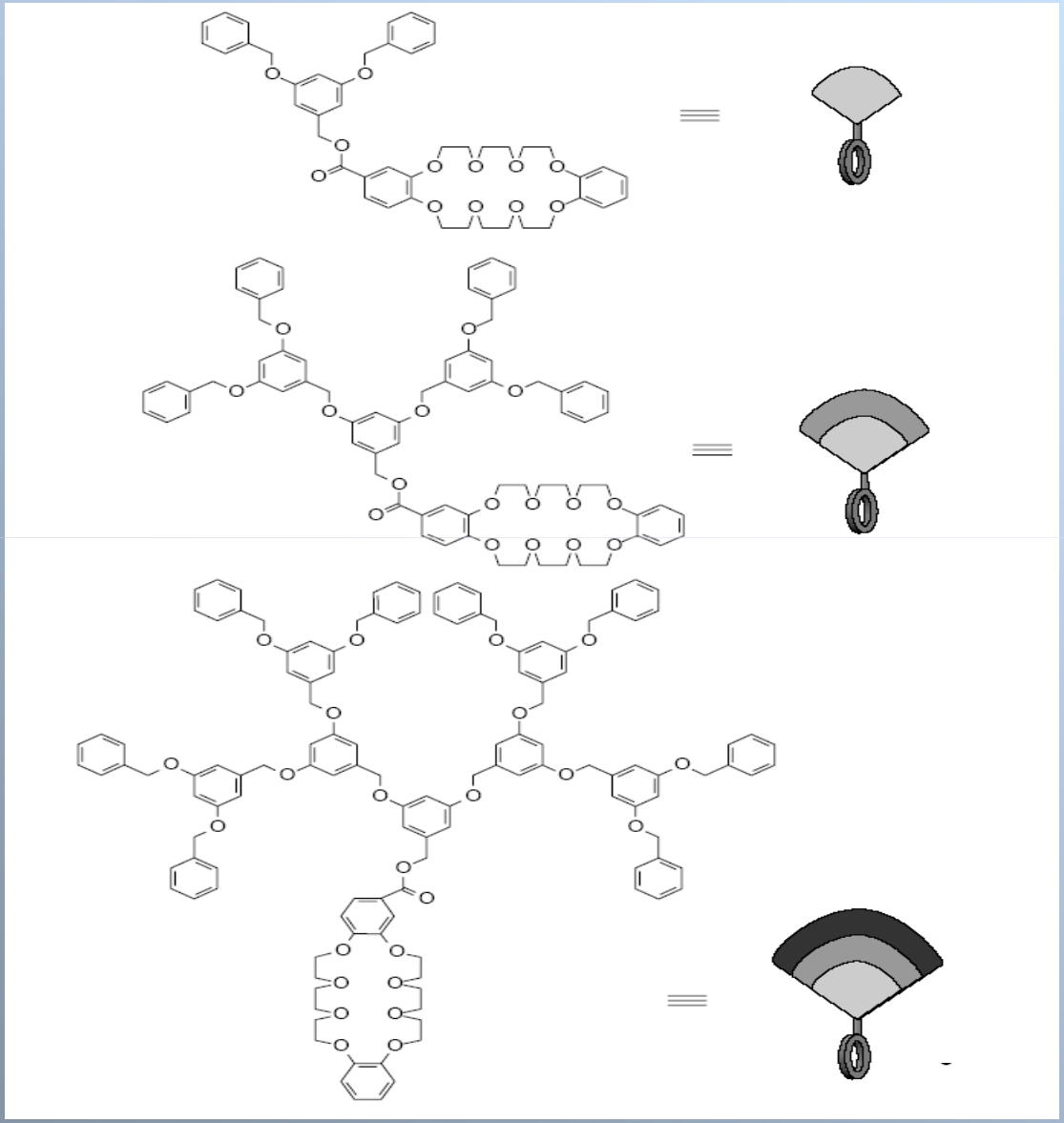
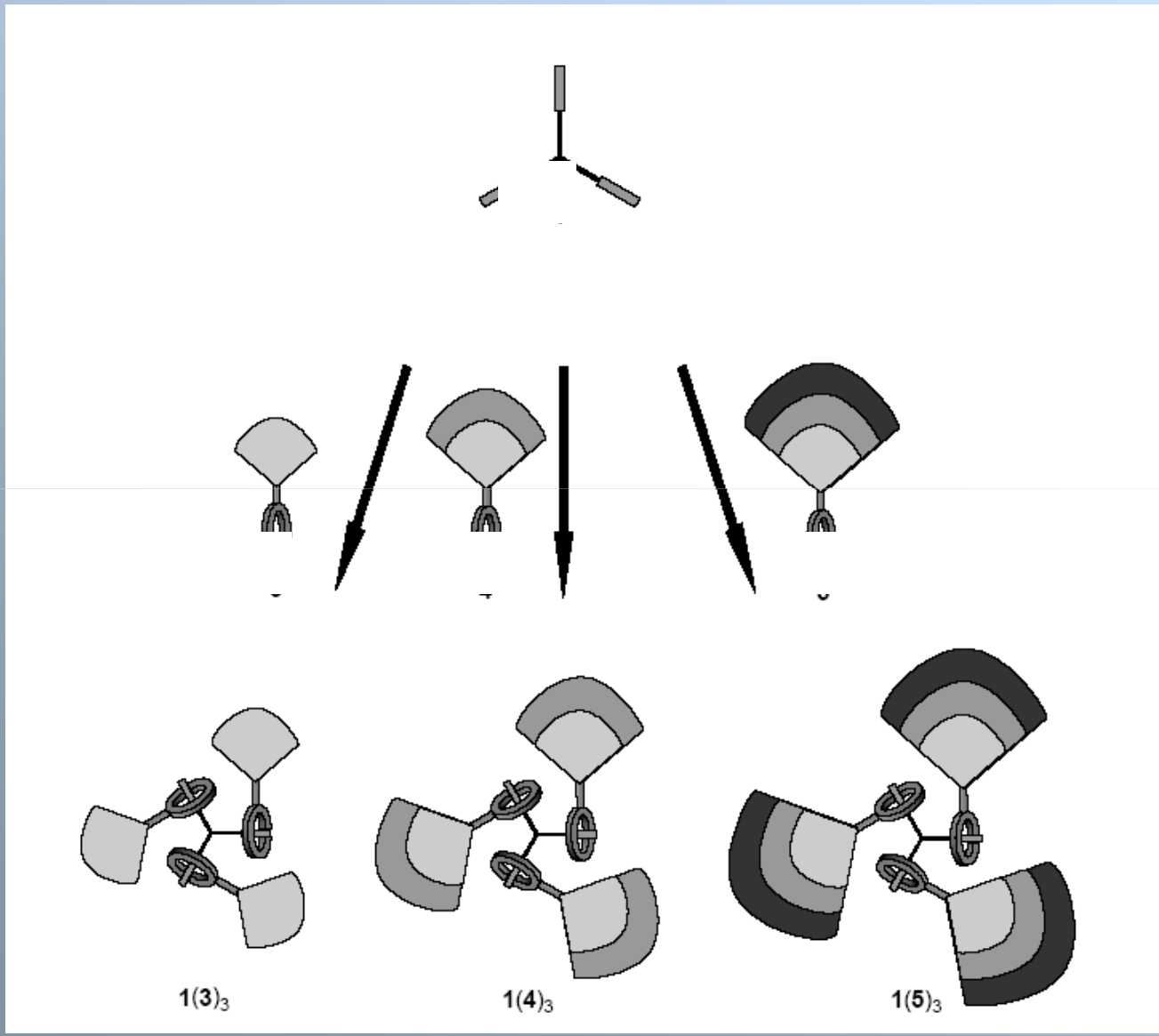
Самосборка дендримеров - 3