

Academia Romana



Structuri supramoleculare polirotaxanice.

Asocierea de molecule neidentice
generatoare de noi proprietati



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**Seminarul National de Nanostiinta si nanotehnologie
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Polirotaxani

exemplu tipic de ansamble supramoleculare

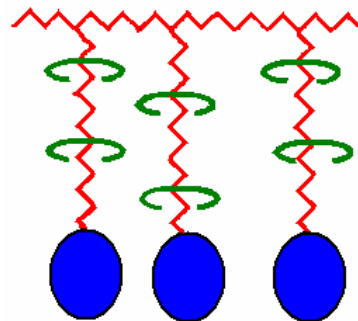
- ❑ ce sunt polirotaxanii?
- ❑ cum se obtin polirotaxanii?
- ❑ de ce studiem rotaxanii?

Polirotaxani: complecsi gazda-oaspete

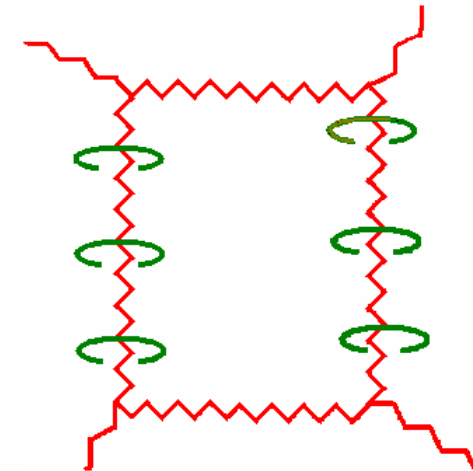
ansamble supramoleculare compuse dintr-un lant macromolecular si molecule macrociclice, legate prin legaturi necovalente si stabilizate termodinamic prin blocarea glisarii macrociclorilor



Polirotaxani pe lant principal



Polirotaxani pe lant secundar



Polirotaxani stabilizati prin reticulare

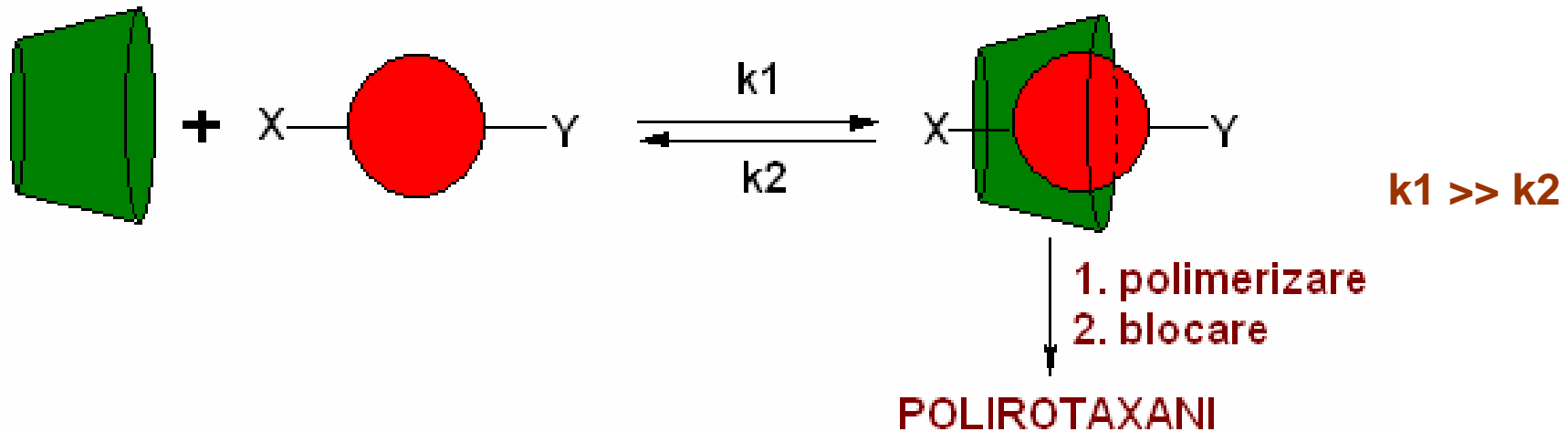
POLIMERI: polieteri (*Harada*), poliesteri (*Gibson*), poliamide (*Wenz*), polisiloxani (*Pinteala*), polimeri conjugati (*Farcas*)

MACROCICLURI: ciclodextrine (*Wenz, Farcas*), eteri coroana (*Gibbson*), calixarene

GRUPARI BLOCANTE: radicali organici voluminosi: trifenilmetan (*Farcas*), piren (*Guegan*)

Obtinerea polirotaxanilor

- Polimerizarea complexelor de incluziune



- Complexarea polimerilor presintetizati



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- Tehnici de obtinere

- Coprecipitare**

- Liofilizare**

- Amestecare energica de dispersii concentrate (paste) ale componentilor**

- Factori care determina complexarea

- Natura componentilor care interactioneaza**

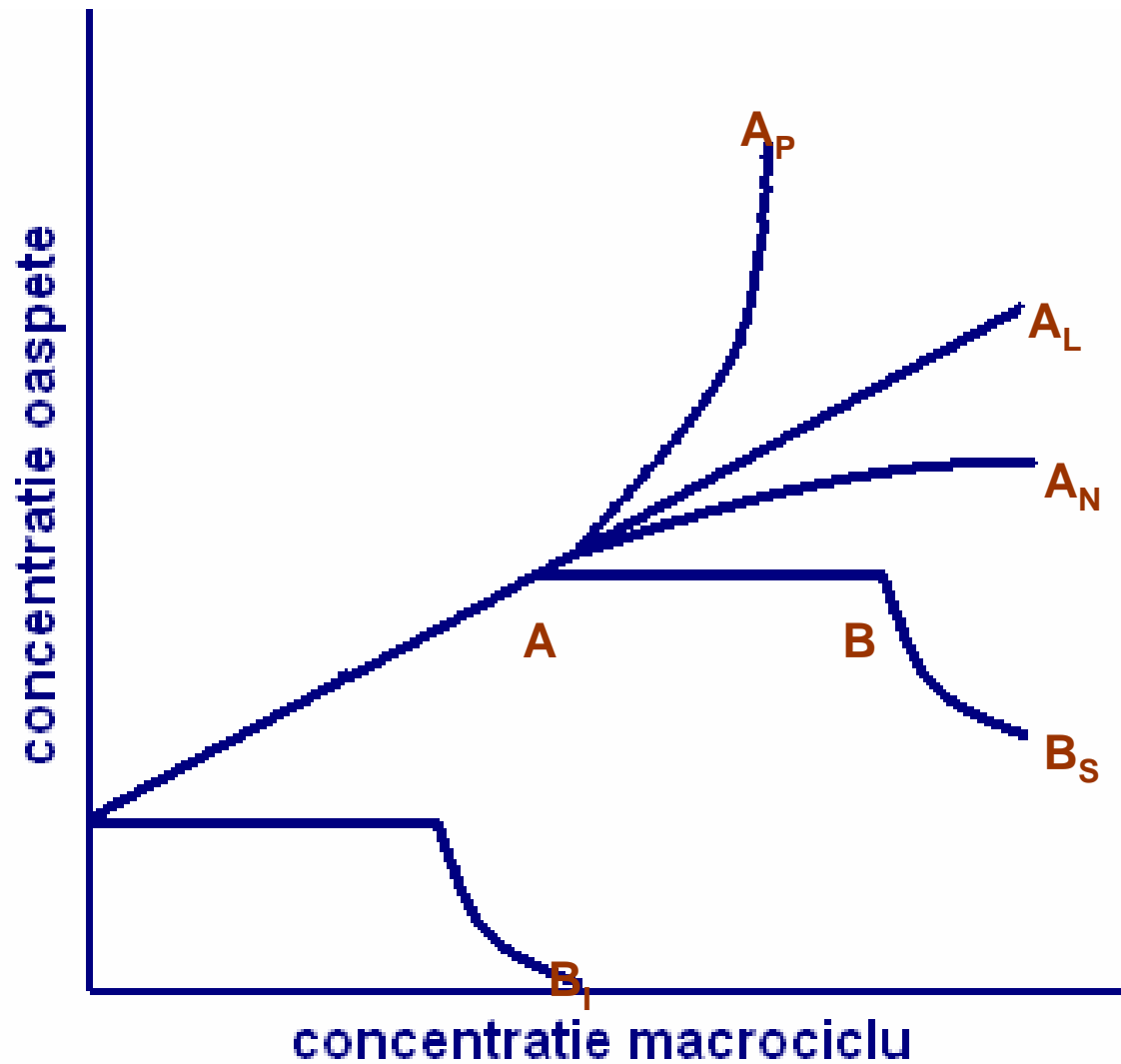
- Polaritatea solventului**

- Complementaritatea dimensionala**

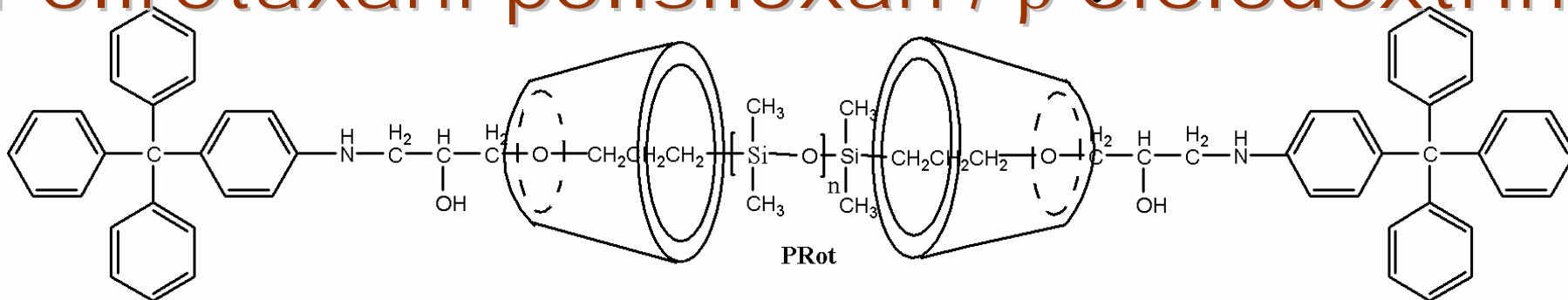
- Concentratia**

- Solubilitatea complexului**

Diagrama de faza (*Higuchi, Connors*)



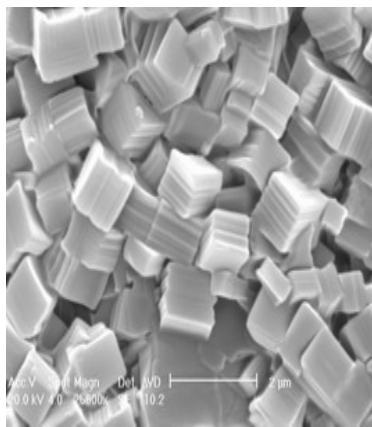
Polirotaxani polisiloxan / β -ciclodextrina



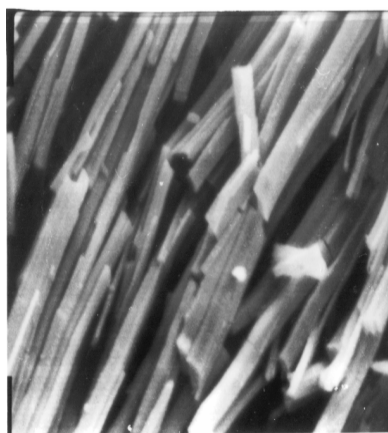
Polidimetilsiloxan: **amorf, lichid, flexibil, puternic hidrofob**

Ciclodextrina: **crystalina, hidrofila**

Polirotaxan: **solid, cu organizare supramoleculara**

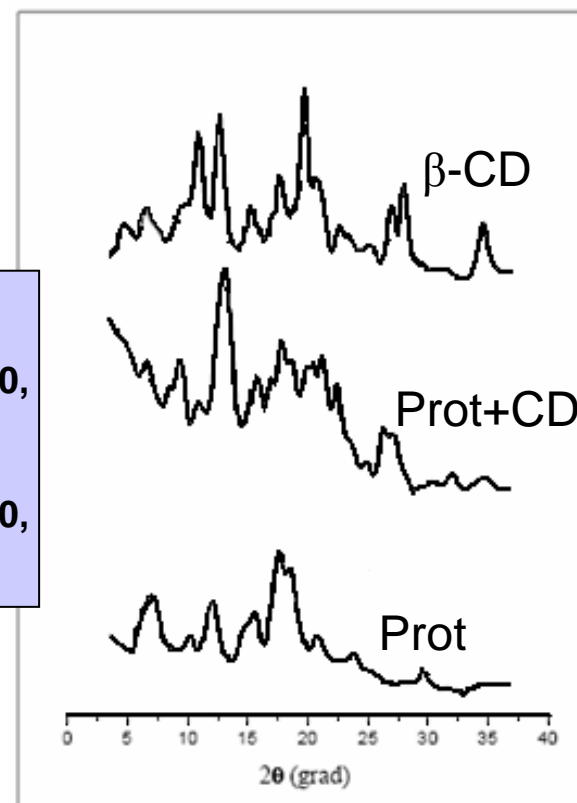


**Polirotaxan+CD
libera**



Polirotaxan

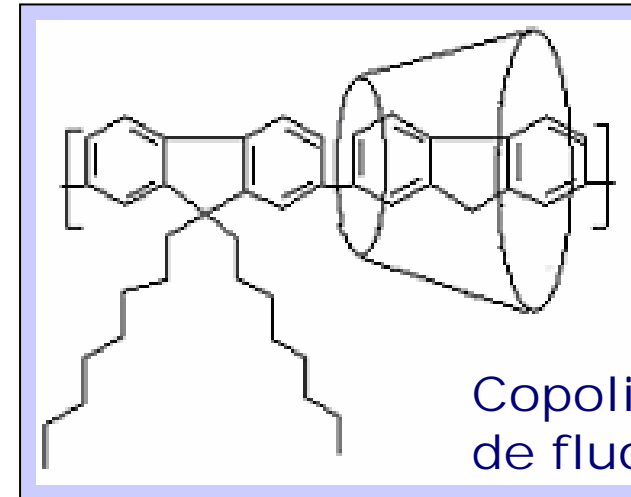
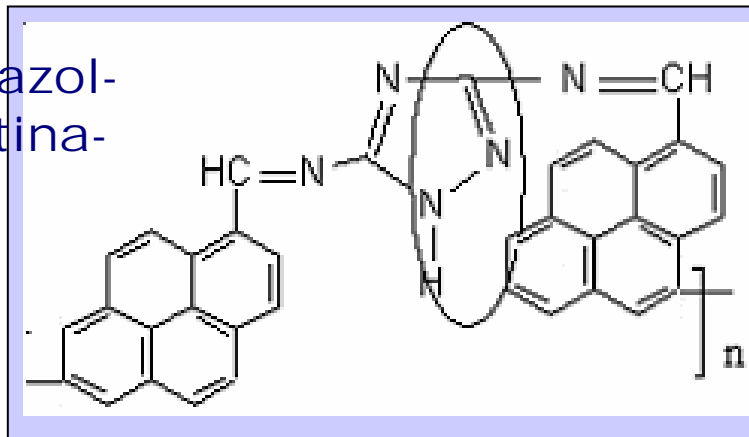
Marangoci et al.
High Perform. Polym. 20,
251 (2008)
Marangoci et al.
High Perform. Polym. 20,
553 (2008)



Polirotaxani polimer conjugat / ciclodextrina

POLIMERI CONJUGATI:

Poli(triazol-
azometina-
piren)



Copolimeri
de fluorena

Proprietati:

- ◆ rigizi
- ◆ Insolubili
- ◆ precipita in timpul polimerizarii la mase reduse
- ◆ proprietati de prelucrare nesatisfacatoare

Includerea in cavitatea interioara a ciclodextrinelor:

- ◆ proprietatile electro-optice sunt conservate sau imbunatatite
- ◆ solubilitate
- ◆ formeaza filme din solutie
- ◆ proprietati mecanice bune

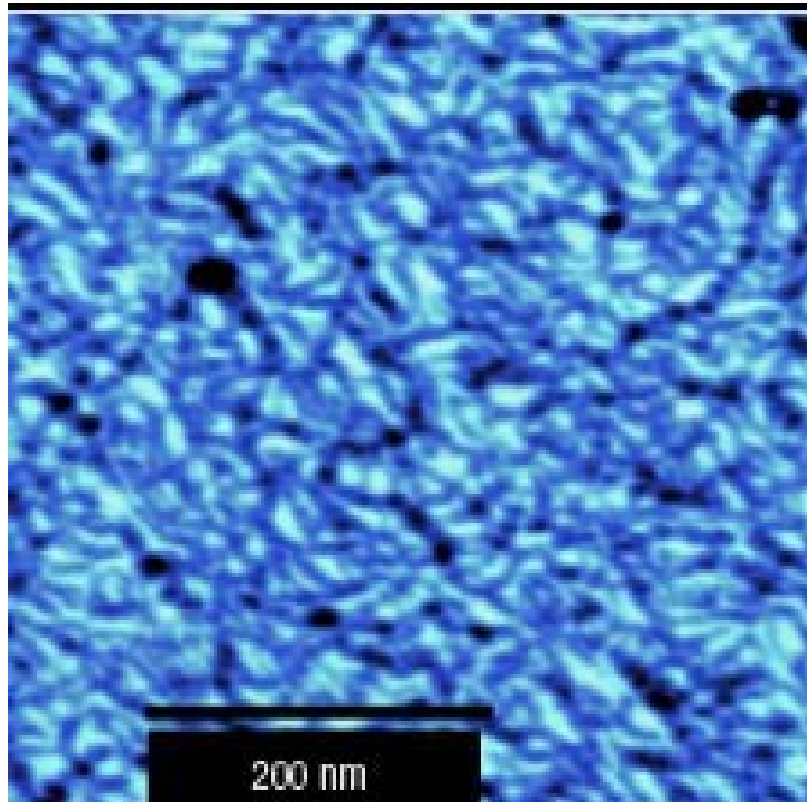
Farcaset al.

Chem. Phys. Lett. 465,
96 (2008)

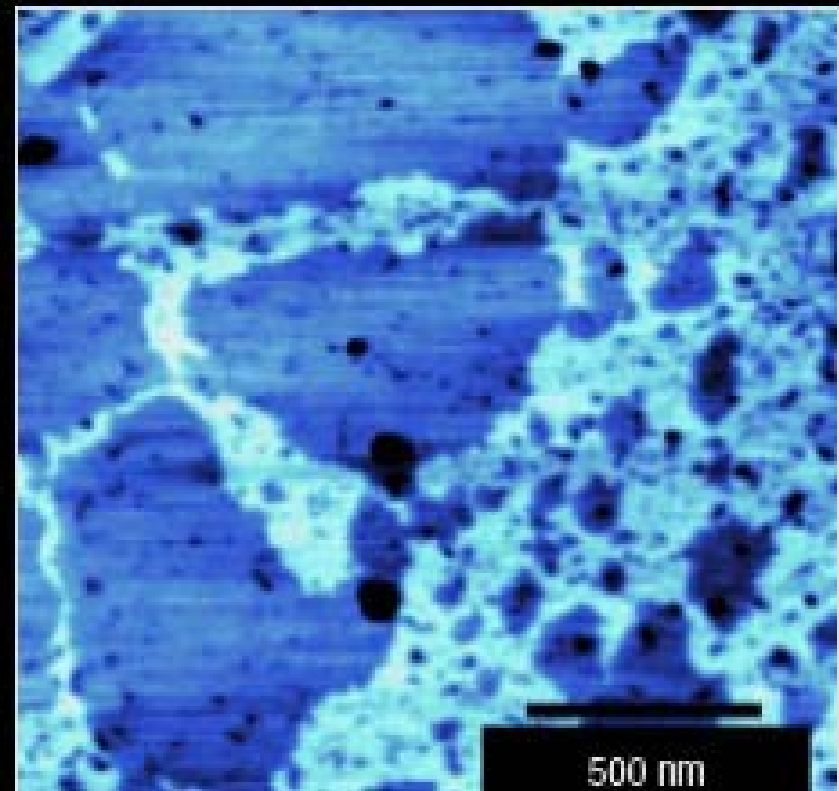
Marangoci et al.

J. Appl. Polym. Sci. 110,
2384 (2008)

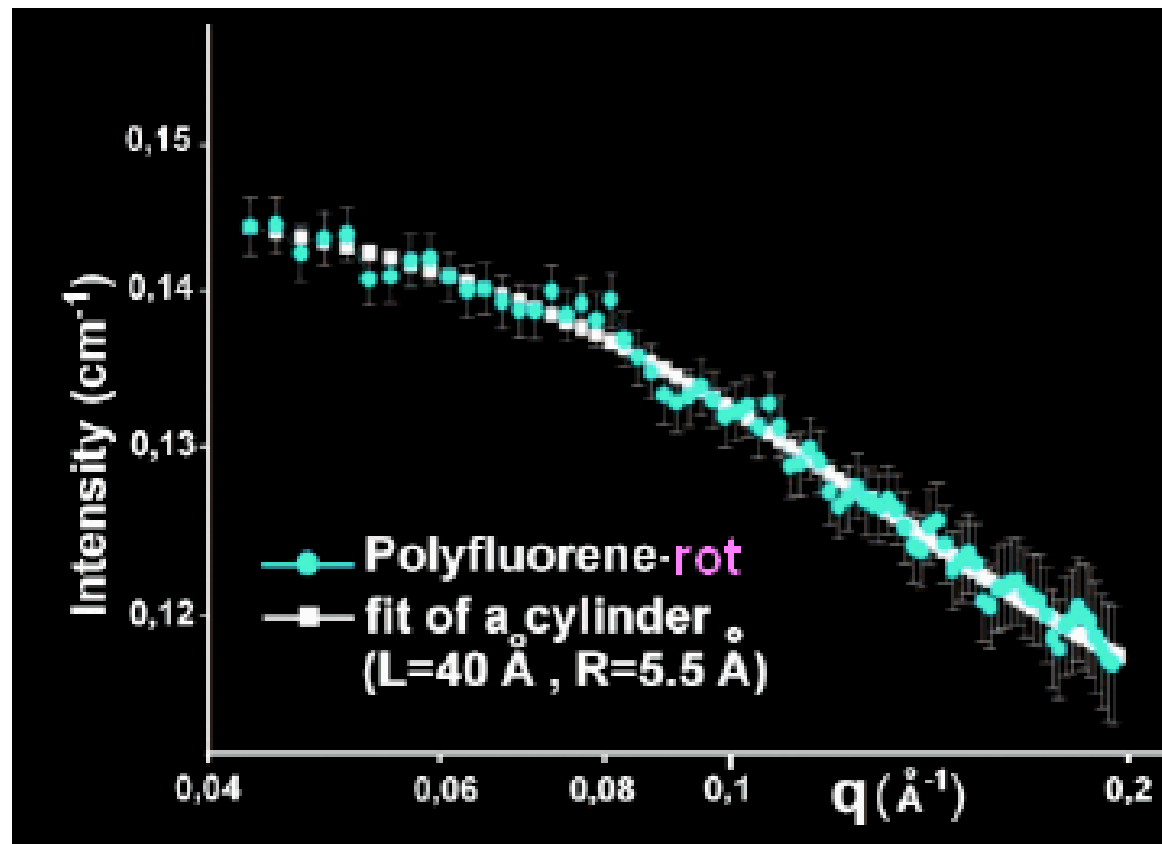
Morfologie de suprafata a filmelor de polifluorena



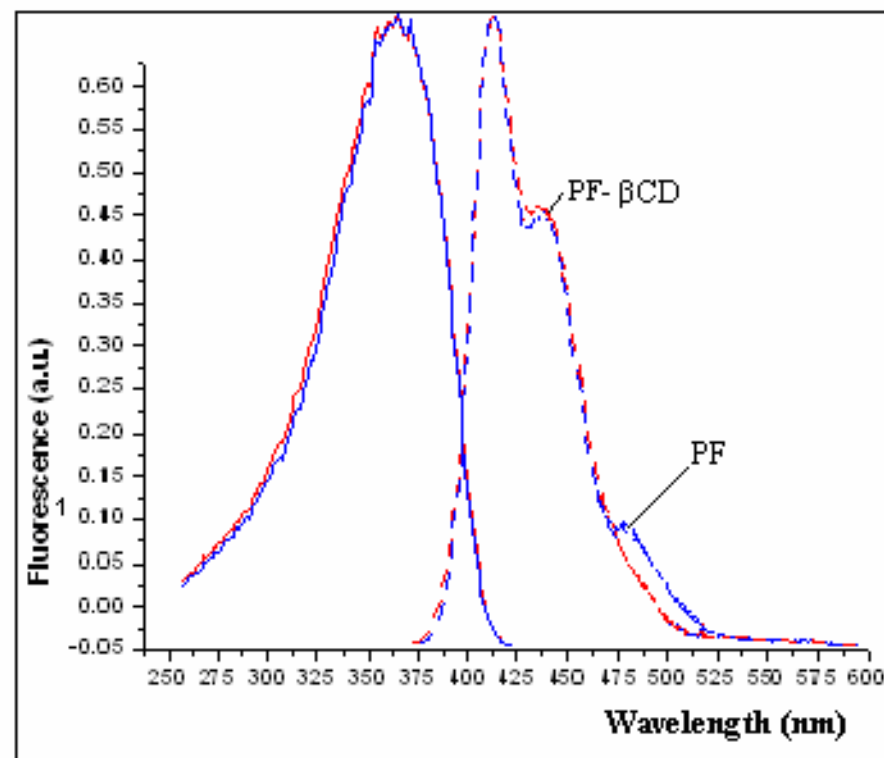
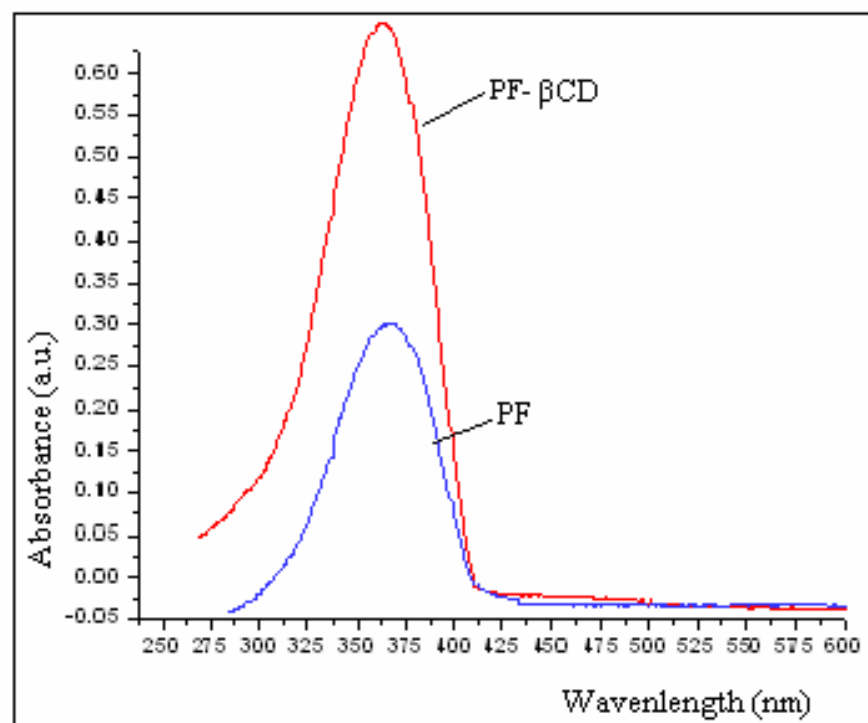
Polirotaxan



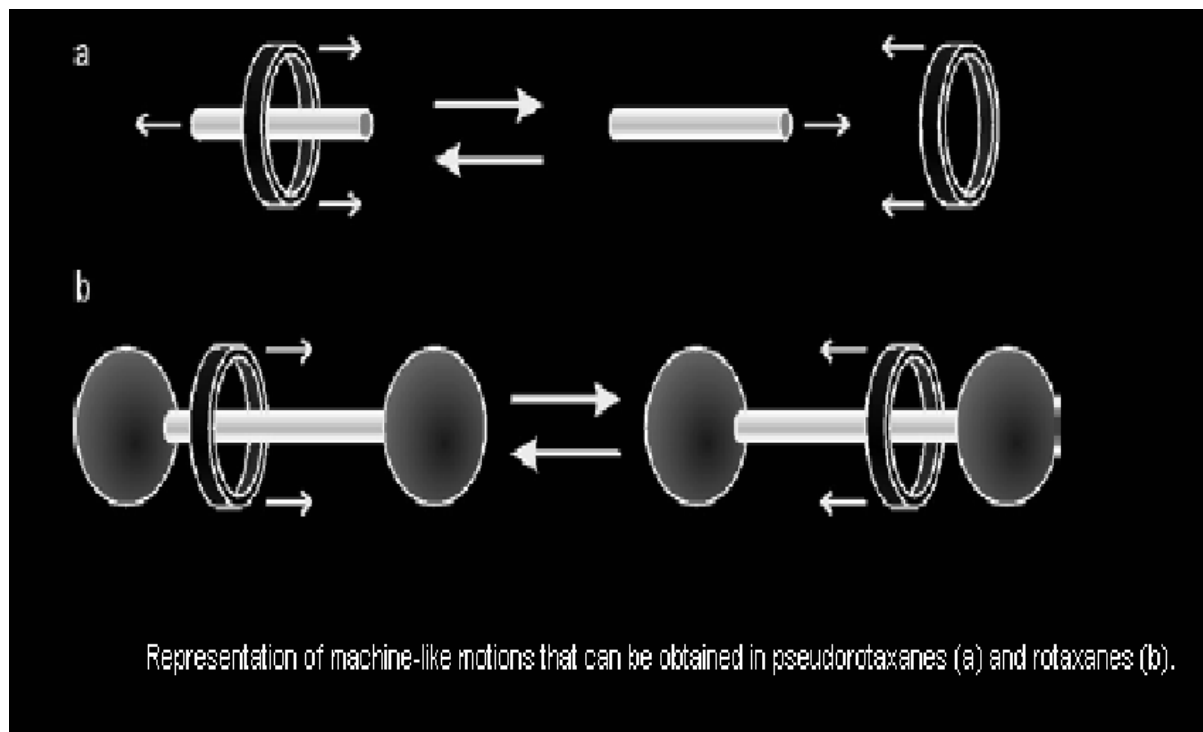
Copolimer model



SANS: copolymer de fluorena / γ -CD; comparatia datelor experimentale cu modelul unei structuri cilindrice



Concluzii



Narcisa Marangoci
Adrian Fifere

Prof. Philippe Guegan
Prof. Sergei Bronnikov

**MULTUMESC PENTRU
ATENTIE !**