Nano structured materials-synthesis, properties, self assembly and applications
by Prof. A.K. Ganguli, Chemistry Department,
IIT Delhi, New Delhi.

Module 2, Lecture 7 and 8: Template method

Problem:

1. Give examples of few templates that can be used for synthesizing nanostructures. (zeolites, silicate glasses)
2. What is the pore diameter of alumina membrane? (10-500 nm)
3. What is the pore diameter of etched mica? (1-500 nm)
4. Bucky ball complexes can be used as _____ hosts. (3D framework)
5. Give examples of 1D tunnel host. (zeolites, lipid bilayer, vesicles)
6. Name few aggregates of surfactants that can be used as templates. (spherical micelles, cylindrical micelles, bicontinuous, vesicles)
7. _____ type of surfactant aggregate can be used for synthesizing nanowires and nanorods. (cylindrical micelles)
8. How will you remove surfactant molecules, once the desired product is formed? (by washing with appropriate solvent or calcination)
9. What is nuclreopore filter? (filters with holes in plastic membrane)
10. What is the size of holes in nucleopore filter? (in the range of few microns)
11. In the electrodeposition method, nanowires can be formed using _____ template and nanowires can be formed using _____ template. (negative, positive)
12. _____ can be used as a surface step-edge template. (Graphene)
13. What is the disadvantage of using a surface step-edge template? (Nanowires cannot be easily removed from the surface on which they are deposited)
14. State the principle the surface step-edge template method is based. (deposition of many materials starts preferentially at defect sites such as surface step edges)

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Solution :

1. zeolites, silicate glasses
2. 10-500 nm
3. 1-500 nm
4. 3D framework
5. zeolites, lipid bilayer, vesicles
6. spherical micelles, cylindrical micelles, bicontinuous, vesicles
7. cylindrical micelles
8. by washing with appropriate solvent or calcination
9. filters with holes in plastic membrane
10. in the range of few microns
11. negative, positive
12. Graphene
13. Nanowires cannot be easily removed from the surface on which they are deposited
14. deposition of many materials starts preferentially at defect sites such as surface step edges