

## Liquid crystals – carbon nanotubes mixture

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The self-organizing properties of nematic liquid crystals can be used to efficiently align carbon nanotubes dispersed in them. The phase ordering of the binary liquid crystal – carbon nanotubes mixture is analyzed as a function of concentration and temperature. We treat the two mixture components on the same footing and combine the Landau-de Gennes free energy for the thermotropic ordering of liquid crystal and Doi free energy for lyotropic nematic ordering of carbon nanotubes caused by their mutually excluded volume. The two coupling limits are studied: (i) **weak anchoring limit** where the alignment is caused by the coupling of essentially unperturbed nematic fluid with the anisotropic interfacial tension of the nanotubes [1] and (ii) **strong anchoring limit** where the nematic ordering around nanotubes is strongly perturbed. We find that the degree of ordering of the nanorods is enslaved by the properties of the host liquid and that it can be tuned by increasing or decreasing the temperature or their concentration.

### References

1. P. van der Schoot, V. Popa-Nita, and S. Kralj, J. Phys. Chem. **2008**, B 112, 4512