Rod-like Viruses as Model System for Studying Chirality Amplification in Colloidal Liquid Crystals

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Rod-like viruses with their features like monodispersity and their ability to organize in ordered structures motivate the strong interest they have raised as model systems for soft condensed matter. Suspensions of rod-like viruses form a variety of liquid crystalline phases [1], whose general behavior can be explained in terms of a few parameters, namely the volume fraction and the rod aspect ratio [2].

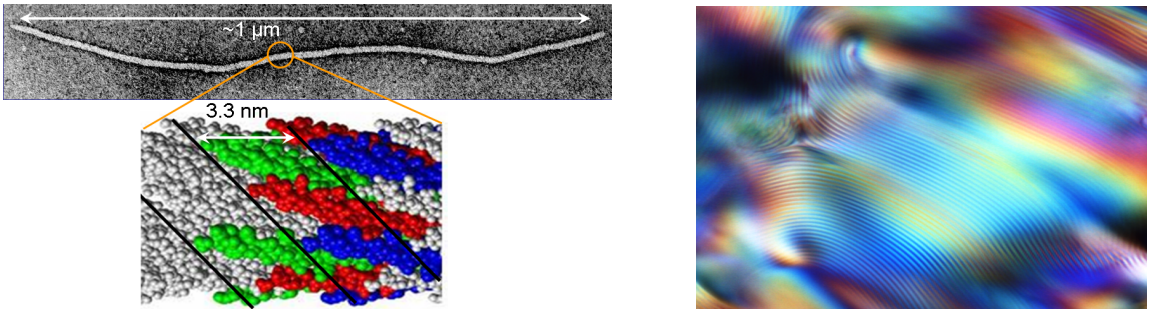

Figure. Filamentous virus observed by electron microscopy with a schematic representation of its capsid, and polarizing optical microscopy picture of the cholesteric phase formed by virus suspensions (Image size: 750µmx500µm).

In this context, filamentous viruses and their mutants represent a paradigm for studying the connection between chirality of the elementary building blocks and the macroscopic twist displayed by the liquid crystalline phases [3,4,5]. If some investigation has been already done to predict the cholesteric twist (pitch and handedness) based on the microscopic features of the viral particles [6], we will present here recent results on chemically and biologically modified viruses [7], where the balance between the different chiral contributions (steric, electrostatic, excluded-volume…) of opposite handedness will be discussed.

References

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