Polyelectrolyte Complexes
from Oppositely Charged Filamentous Bacteriophages

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The filamentous fd bacteriophage is used as a well-defined model system for elongated colloidal particles, which can e.g. be used to study the formation of lyotropic liquid crystalline phases or the general flow behavior of elongated particles. Here we chemically modify the filamentous bacteriophage fd (or fd virus) to obtain opposite charges [1], such that the modified virus is positively charged at neutral pH, whereas the bare virus is negatively charged at neutral pH. These oppositely charged viruses are mixed to explore polyelectrolyte formation [2], i.e. whether or not the mixtures phase separate, or form aggregates, a gel or liquid crystalline phases, and in addition the observations are compared to preliminary static light scattering measurements. These results are rationalized by comparing to theoretical calculations based on prior electrophoresis measurements [3], to obtain an effective interaction potential between oppositely charged viruses. In summary, the presented results show that these mixtures of oppositely charged bacteriophages are an interesting model system to study the formation of polyelectrolyte complexes.

References

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