

SPP 2171 Workshop: "Wetting of Flexible, Adaptive, and Switchable Substrates"

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Schroeder's paradox in polymeric surfaces

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In 1903, von Schroeder reported that gelatin swelled more in water or salt solutions than in the corresponding saturated vapors.[1] Since these phases are in equilibrium, it is surprising that they display different partitioning behaviour, and hence this result has become known as Schroeder's paradox. It has since been found to occur in other cross-linked polymer systems as well, and has received some attention from membrane researchers due to its impact on moisture management in polyelectrolyte membranes. However, its effects on polymeric interfaces, such as gel interfaces or polymer brush coatings, remain relatively unexplored. I present theory and simulations investigating whether Schroeder's paradox occurs in polymer brushes and what its origins may be.

1: Schroeder, P. Über Erstarrungs- und Quellungserscheinungen von Gelatine. Z. Phys. Chem., Stoechiom. Verwandtschaftsl. 1903, 45U, 75, DOI: 10.1515/zpch-1903-4503

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