Soft Matter Analysis via Atomic Force Microscopy (AFM): A Review

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Abstract

Soft materials or soft condensed matter are being globally developed for various technological applications for chemical, consumer goods, pharmaceutical, agri-business, and petroleum industries. Hence, research interest is consistently growing in experimental studies of the dynamics, structure, and morphology of soft materials as well as soft interfacial materials. This review focuses on atomic force microscopy (AFM), one of the many analytical tools conventionally used for solid matter research studies, and presently being expanded into the research area of soft materials. When appropriately utilised, AFM provides a suitable alternative to soft matter investigation. The main AFM modes discussed are contact, non-contact, and tapping modes. This review also provides discussions on the working principle of each AFM mode and its applications in soft matter analysis in recent years. Finally, a critical analysis and comparison of the imaging modes is carried out to identify the advantages and disadvantages of the aforementioned modes applied in relevance to soft matter analysis.

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