

## 液中 sub-nm AFM による有機結晶粒子表面に存在する分子配列の可視化

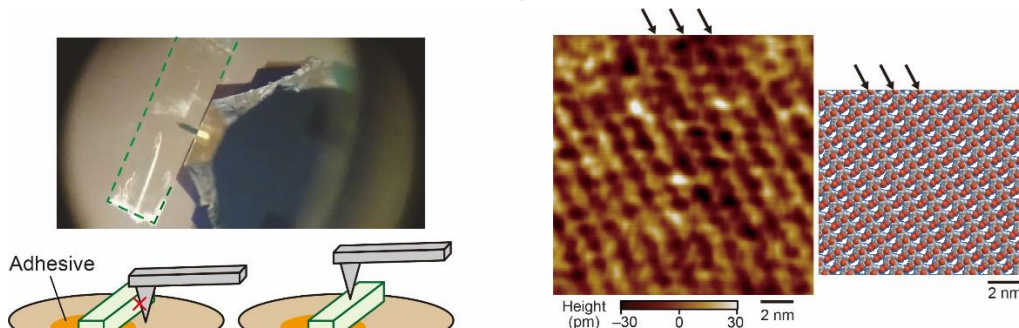
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Visualization of molecular arrangement on the particle surfaces of organic crystals by sub-nm resolution AFM in liquid (<sup>1</sup> College of Science and Engineering, Kanazawa University, <sup>2</sup> Nanomaterials Research Institute (NanoMaRi), Kanazawa University, <sup>3</sup> NanoLife Science Institute (WPI-NanoLSI), Kanazawa University) ○Kodai Tanigawa,<sup>1</sup> Masayuki Morimoto,<sup>2</sup> Hitoshi Asakawa<sup>1,2,3</sup>

The atomic-resolution AFM technique in liquid is a promising analytical tool for understandings of various atomic and molecular-scale phenomena. Although sub-nm resolution AFM imaging of organic crystalline particles is difficult due to their large structures with large steps, it is possible by overcoming technical problems such as handling, fixing and controlling the tip position. In this study, we developed processes for fixing crystalline particles and approaching a tip to the top surface. The developed processes allow us to obtain the sub-nanometer resolution AFM images at the crystal surfaces, resulting visualization of molecular arrangements of organic molecules having 1 nm size. Our results demonstrate that the combination sub-nm resolution AFM technique and the established processes makes it possible to visualize sub-nm surface structures at any organic crystals.

**Keywords :** Atomic force microscopy; Organic crystalline particle

技術開発が進む液中原子分解能を有する原子間力顕微鏡(液中超解像AFM)は様々な原子・分子スケール現象解明への貢献が期待される。大きな構造を持つ結晶粒子の超解像計測は容易ではないが、結晶粒子のハンドリング・固定化や探針位置の調整方法を工夫することで結晶粒子表面の原子・分子スケール観察を実現できると考えた。本研究では、計測モデルとして有機小分子(TBrPM, 約1 nm)からなる結晶粒子表面を液中超解像 AFM で計測する方法を検討した。その結果、サブナノメートル分解能の AFM 像を取得でき、結晶表面の分子配列に由来するパターンを可視化できた。液中 sub-nm AFM を有機結晶粒子のサブナノ分解能計測へ展開できることを実証した。



**Fig. 1.** Sub-nm AFM imaging of organic crystals based on the established process.