

〈一般論文〉

## 原子間力顕微鏡による毛髪の微細構造と物性の研究

北野宏樹<sup>\*,\*\*</sup>, 丹羽正直<sup>\*</sup>, 藤波 想<sup>\*\*</sup>, 中嶋 健<sup>\*\*</sup>,  
西 敏夫<sup>\*\*</sup>, 内藤幸雄<sup>\*\*\*</sup>

### Research on Fine Structures and their Mechanical Properties of Hairs by Atomic Force Microscope

Hiroki KITANO,<sup>\*,\*\*</sup> Masanao NIWA,<sup>\*</sup> So FUJINAMI,<sup>\*\*</sup> Ken NAKAJIMA,<sup>\*\*</sup>  
Toshio NISHI,<sup>\*\*</sup> Sachio NAITO<sup>\*\*\*</sup>

(Accepted July 25, 2006)

#### Abstract

Here, we report the first success in the observation of the fine structures of hair in the investigation of the corresponding viscoelastic properties in water and in air. We examined the various mechanical properties of the extremely smooth surface of the hair cross-section by force modulation techniques installed in an atomic force microscope (AFM). The AFM images representing the distribution of the rigidity of each fine structures were completely similar to those of the usual transmission electron micrograph (TEM). Consequently, we could determine the qualitative and semi-quantitative changes caused by the chemical damages of hair and the repairing effect of conditioning agents at nano-size level.

**Key words:** hair, atomic force microscope, ultra structure, mechanical property.