

〈原 著〉

## 毛髪 の 損傷 と 銅 の 吸着 — けい光 X 線分析法による銅の定量 —

原田裕文\*・雨宮 敬\*・田村健夫\*\*・安田利顕\*\*

### Correlation between Hair Damage and Copper Adsorption — Determination of Copper on Hair by X-Ray Fluorescence Analysis —

Hirofumi HARADA\*, Takashi AMEMIYA\*  
Takeo TAMURA\*\*, Toshiaki YASUDA\*\*

#### Abstract

1. When hair was immersed in a solution of copper sulfate under the fixed conditions, and the copper absorbed on the hair was experimentally determined with fluorescent X-Ray in an attempt to attain an analytical method, a fairly satisfactory determination method was obtained.
2. After hair samples as heavy as 150 mg were immersed in a solution of copper sulfate at ordinary temperature for one hour, they were filtered through a glass filter, washed with ammoniacal liquid of pH 9.6, and dried. Although the measurement was repeated on the hair in a normal condition or damaged with a hair bleach liquid or damaged with a permanent wave liquid, reproducibility with less variations was recognized.
3. Correlation between a damaged degree of hair and an adsorbed amount of copper was studied. As shown in Table 2, it was recognized in the hair damaged by a bleach liquid that the more the concentration of hydrogen peroxide was higher, the more the amount of adsorbed copper had increased. As shown in Tables 3 and 4 on the damaged hair caused by a permanent wave liquid, it was recognized that the more the concentrations of pH of the first liquid and thioglycollic acid as well as the temperature were higher, the more the amount of adsorbed copper had increased. From the above experimental results, it was considered that an amount of copper adsorbed on the hair that could be analyzed with the fluorescent X-Ray determination method may be used for measuring of damages caused to the hair.