

Semiquantitative Analysis of Solid Surfaces by X-Ray Photoelectron Spectroscopy(Chemistry)

| | |
|------------------------------|--|
| 著者 | HIROKAWA Kichinosuke, OKU Masaoki, HONDA Fumihiro |
| journal or publication title | Science reports of the Research Institutes, Tohoku University. Ser. A, Physics, chemistry and metallurgy |
| volume | 27 |
| page range | 83-83 |
| year | 1979 |
| URL | http://hdl.handle.net/10097/28041 |

Semiquantitative Analysis of Solid Surfaces by X-Ray Photoelectron Spectroscopy

Kichinosuke HIROKAWA, Masaoki OKU and Fumihiro HONDA

Bunseki Kagaku (Japan Analyst), **26** (1977), T7.

An application of the equation (1) to the semiquantitative analysis of solid surface by X-ray photoelectron spectroscopy were performed.

$$\frac{N_a^1}{N_b^m} = \frac{n_a \cdot \sigma_a^1 \cdot \lambda_a^1 \cdot S_a^1}{n_b \cdot \sigma_b^m \cdot \lambda_b^m \cdot S_b^m} \dots\dots\dots (1)$$

Where n is the concentration of the element in terms of atoms per unit volume, N is the intensity of ejected photoelectrons, σ is the photoionization cross section, λ is the mean free path for photoelectron in the sample, and S is the spectrometer (sensitivity) factor. The atomic ratios of oxygen to metal element in some oxides could be obtained with satisfactory results by the application of theoretical values of photoionization cross sections and mean free paths. In this case the summation of main and satellite peak intensities were employed for the calculation. Furthermore the atomic ratio of metallic state elements, oxide state ones and oxygen on copper-nickel alloy surface and surface enrichment of nitrogen and sulfur on iron surface were discussed.

SiC Bodies Sintered with Three-Dimensional Cross-Linked Polycarbosilane

Seishi YAJIMA, Toetsu SHISHIDO and Kiyohito OKAMURA

Amer. Ceram. Soc. Bull., **56** (1977), 1060.

A method was developed to produce sintered SiC bodies by using three-dimensional cross-linked polycarbosilane as a binder. The polycarbosilane was added to the SiC powder and the resulting powder mixture was sintered at $\approx 1100^\circ\text{C}$. Hot pressing was not required. The SiC bodies obtained have a low density (2.66 g/cm^3) but a high bend strength (250 MN/m^2) and excellent oxidation resistance.

Semiconducting Properties of $(\text{Ln}_I, \text{Ln}_{II})\text{CuO}_4$ and of $(\text{Ln}, \text{A})_2\text{CuO}_4$ (Ln=rare earth, A=alkaline earth)

Tadao KENJO and Seishi YAJIMA

Bull. Chem. Soc. Jap., **50** (1977), 2847.

The ternary oxides, $(\text{La}, \text{Pr})_2\text{CuO}_4$, $(\text{Gd}, \text{Tb})_2\text{CuO}_4$, $(\text{La}, \text{Tb})_2\text{CuO}_4$, $(\text{La}, \text{Ca})_2\text{CuO}_4$ and $(\text{La}, \text{Ba}_2)\text{CuO}_4$, were prepared and their semiconducting properties were investigated. When the mean ionic radius of $\text{Ln}^{3+}(\bar{r})$ is increased, the $(\text{La}, \text{Pr})_2\text{CuO}_4$ compounds transform from semiconductors to metals at a critical \bar{r} value of 1.05\AA . The metal-semiconductor transition which accompanies the shrinkage of the a axis, is explained as being due to the π -bond formation of the Cu-O bond. Compounds in the composition range from $\text{La}_{1.3}\text{Tb}_{0.7}\text{CuO}_4$ to $\text{La}_{1.4}\text{Tb}_{0.6}\text{CuO}_4$ are peculiar to the $(\text{La}, \text{Tb})_2\text{CuO}_4$ compounds. The crystal structure is the same as that of Ln_2CuO_4 , but it is different from Ln_2CuO_4 as regards the c/a ratio and resistivity. The doping of 20 mol% CaO or 10 mol% BaO into La_2CuO_4 lowers the resistivity to tenth of that of La_2CuO_4 .