Lecture

Log-Log 表示による AES スペクトル：拡張 Sickafus プロット

Log-Log display of AES spectra : advanced Sickafus plot

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"Log-Log" display mode, which is called as "Sickafus" plot, has occasionally been employed in subtracting a large background to recover the small Auger structures in AES with some convenience. While the "differential" method has commonly been used as Auger spectra for the background subtraction.

Seah seems to be the first to observe linearized cascade from a clean surface using the Log-Log display mode [1]. But Sickafus described it in detail and it might be seen successful for the particular background [2][3][4]. He said that any Auger emission that can be detected in the derivative mode can be observed in the Log-Log mode, but the converse is not always true [2]. The Sickafus plot alone is not always successful and may need the aid of the background subtraction program [5].

Our Log-Log plot covers the whole range of energy distribution including Auger spectra in one sheet of plot, say "advanced Sickafus plot". While Sickafus's Log-Log background subtraction method the emphasis is placed on the small particular observing segment of the linearized secondary-electron cascade. Fig. 1 shows the full range of spectra of a copper surface by 5eV though 5keV beam of incident electrons. Besides the main structures, interband transitions [6] and structures due to the plasmon excitation [6] can easily be detected and compared in the low energy of true secondary electron range. The blow up of the Auger peak spectra of the copper surface for electron energies from 20 eV to 200 eV, this is suitable for the Sickafus plot, and from 600ev to 1200 eV are shown in Fig. 2 and Fig. 3, respectively. The full range of spectra of C, Al, Si, Ni, Cu, W, Pt and Au for primary electron energies 5KeV are shown in Fig. 4. Compared to the Sickafus's Log-Log background subtraction method, the Auger signal profile obtained by the advanced Sickafus plot method shows Auger electron intensities in relation to the other (energies and materials) structures of the energy distribution and would reveal much better information.

[1]. M. P. Seah, Surf. Sci., 17, 132 (1969).
[2]. E. N. Sickafus, Phys. Rev.,B16, 1436 (1977).
[3]. E .N. Sickafus, Phys. Rev., B16,1448 (1977).
[4]. E. N. Sickafus, Surf. Sci., 100, 529 (1980).
[5]. D. Aberdam et al. Surf. Sci.71,279(1978).
[6]. F. Pellerin et al. Surf. Sci. 103,510(1981).

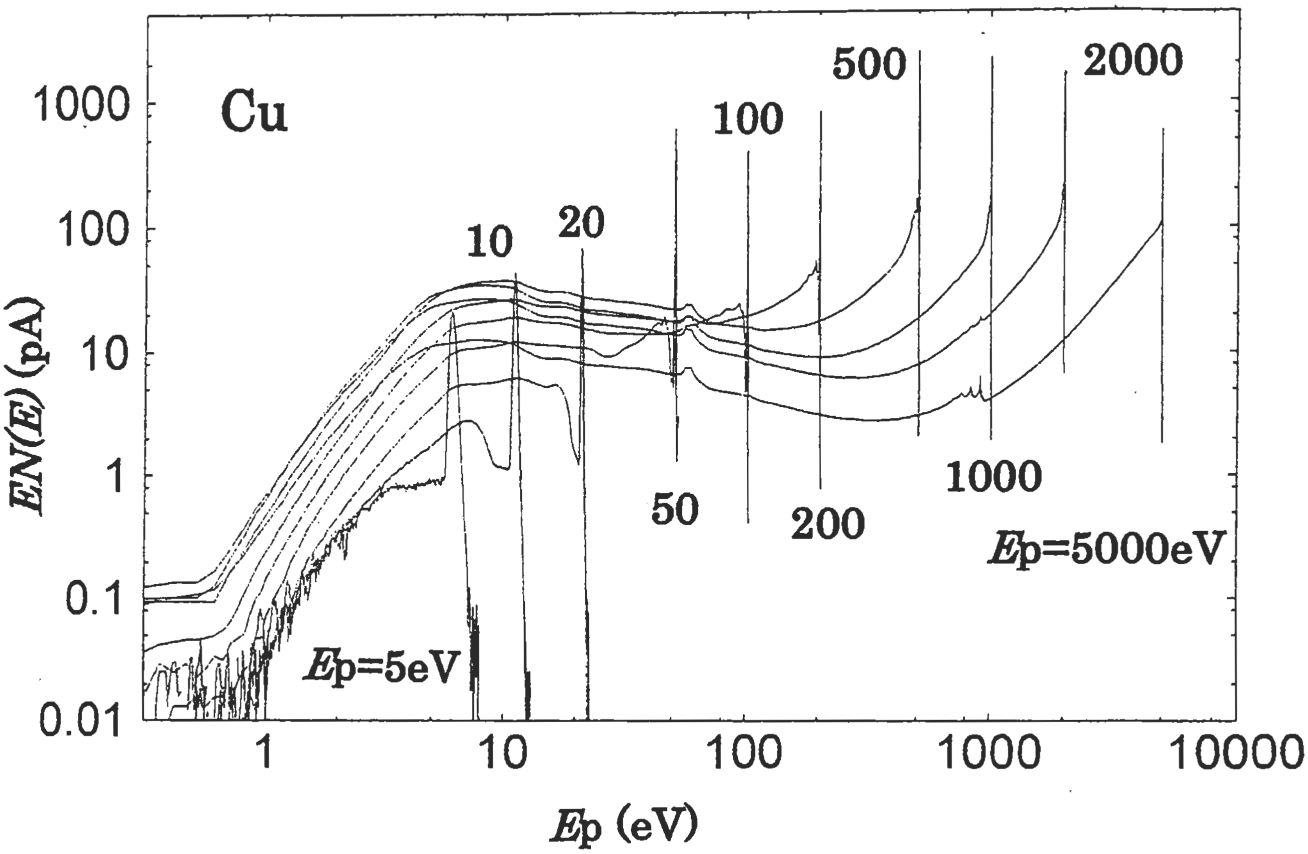

Fig.1. Full range of spectra of a copper surface for primary electron energies from 5 eV to 5000 eV.

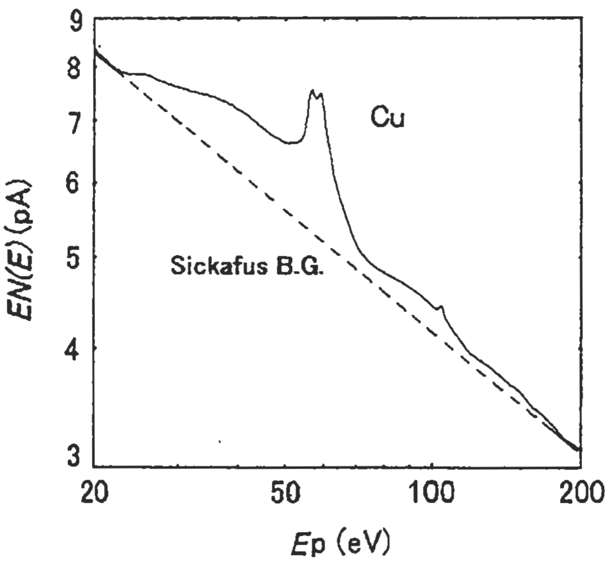

Fig.2. The blow up of the Auger spectra of the Cu surface for electron energies from 20 eV to 200 eV.

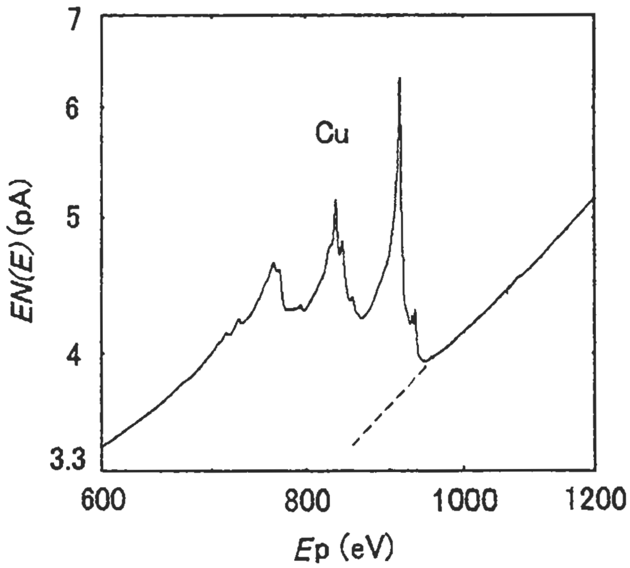

Fig.3. The blow up of the Auger spectra of the Cu surface for electron energies from 600ev to 1200 eV.

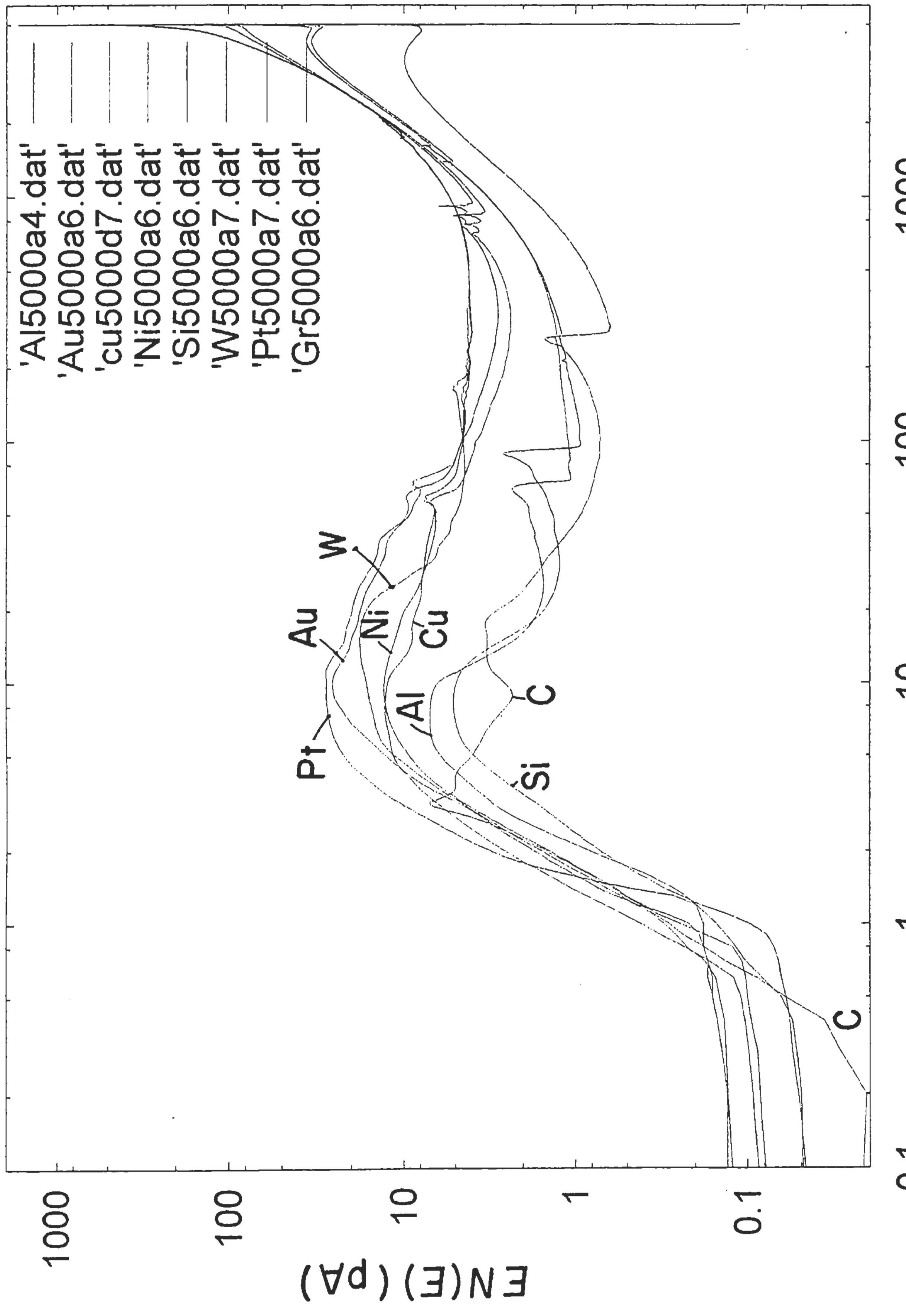

Fig.4. The full range of spectra of C, Al, Si, Ni, Cu, W, Pt and Au for primary electron energies 5000eV.