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Analytical Sciences
The Japan Society for Analytical Chemistry

ONLINE ISSN : 1348-2246
PRINT ISSN : 0910-6340

Analytical Sciences
Vol. 26 (2010) , No. 2 p.209

[PDF (835K)] [References]

Non-destructive Depth Profiling of the Activated Ti-Zr-V Getter by Means of Excitation Energy Resolved Photoelectron Spectroscopy

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(Received August 1, 2009)
(Accepted December 28, 2009)

Non-evaporable Ti-Zr-V ternary getters (NEGs) were studied by means of excitation energy resolved photoelectron spectroscopy (ERXPS). We attempted a quantitative study of the in-depth redistribution of the NEG components during activation. The samples were prepared *ex-situ* by DC magnetron sputtering on a stainless-steel substrate. The ERXPS measurements were carried out at two incident photoelectron beam angles at energies of 110, 195, 251, 312, 397 and 641 eV. Besides these photon energies, also standard X-ray photoelectron spectroscopy (XPS) was used at a photon energy of 1254 eV. We accumulated Ti 3s, Ti 3p, Ti 3d, V 3s, V 3p, V 3d, Zr 3p, Zr 3d, Zr 4s, Zr 4p, Zr 4d, C 1s, O 1s and O 2s photoelectron peak intensities as functions of the kinetic energies given to them. Under simplifying assumptions, Monte-Carlo calculations of the activated sample concentration profiles were performed to fit the measured spectra intensities. The results proved an in-depth redistribution of the components during the activation process. This way we also contributed to a further development of non-destructive depth profiling by electron spectroscopy techniques.

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To cite this article:
Jirí PAVLUCH, Ludomir ZOMMER, Karel MAŠEK, Tomáš SKÁLA, František ŠUTARA, Václav NEHASIL, Igor PÍŠ and Yaroslav POLYAK, *Anal. Sci.*, Vol. *26*, p.209, (2010) .

doi:10.2116/analsci.26.209
JOI JST.JSTAGE/analsci/26.209

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