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MICROAUTORADIOGRAPHY OF THE ELEMENTS EMITTING
HEAVY CHARGED PARTICLES WITH FINE GRAIN X-RAY
PLATES

A microautoradiographic technique for the determination of the elements which upon neutron irradiation emit heavy charged particles due to the (n, α) and (n, f) reaction was developed. Fine grain X-ray plate is used as the image recording materials. The emulsion is pressed toward the surface of the polished specimen. Both are then irradiated in the core of a nuclear reactor. A latent image is formed in the emulsion by charged particles emitted from the specimen. The latent image becomes visible on treatment of the exposed plates in X-ray developer and /or fixer. A relief image with excellent definition, high signal - to - noise ratio and high spatial resolution is created. The image can be seen in the reflected light of the optical microscope. The blackening of the emulsion due to the β -particles, γ -rays and visible light has no disturbing effect on the observation of the image. The relief image allows the use of the electron microscope for examination and hence the improvement of the spatial resolution.

It is shown that the technique is able to produce good quality autoradiographs of boron and uranium in solids using Kodak Maximum Resolution plates. A high neutron fluence of the order of 10^{16} ncm^{-2} is required. Microautoradiographs of boron in steel and uranium in uranium ore are presented illustrating the capability of the technique.