Characterization of small-scale samples using radioisotope positron sources

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Probing of small-scale samples such as thin ion-implanted layers or TEM discs using conventional encapsulated positron sources is usually complicated by positron annihilation outside the inspected volume. Besides, experimental spectra obtained from samples containing internal transmutation-based positron source are naturally disturbed by positron emission outside of the sample. To estimate these contributions to the spectra, Geant4 simulation toolkit was used. In addition to various absorption profiles of positrons from realistic encapsulated sources, the applicability of the use of TEM disc containing 44Ti//44Sc [1] as external positron source is reviewed.

References

[1] V. Krsjak, Y. Dai, Microstructural probing of ferritic/martensitic steels using internal transmutation-based positron source, J. Nucl. Mater. 465 (2015) 311–315.

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