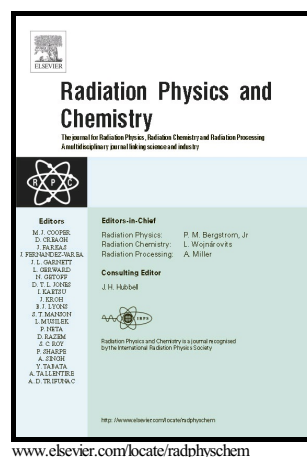


# Author's Accepted Manuscript

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**Concept development of X-ray mass thickness detection for irradiated items  
upon electron beam irradiation processing**

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**Abstract:** The present project will adopt the principle and technology of X-ray imaging to quickly measure the mass thickness (wherein the mass thickness of the item = density of the item  $\times$  thickness of the item) of the irradiated items and thus to determine whether the packaging size and inside location of the item will meet the requirements for treating thickness upon electron beam irradiation processing. The development of algorithm of X-ray mass thickness detector as well as the prediction of dose distribution have been completed. The development of the algorithm was based on the X-ray attenuation. 4 standard modules, Al sheet, Al ladders, PMMA sheet and PMMA ladders, were selected for the algorithm development. The algorithm was optimized until the error between tested mass thickness and standard mass thickness was less than 5%. Dose distribution of all energy (1-10MeV) for each mass thickness was obtained using Monte-carol method and used for the analysis of dose distribution, which provides the information of whether the item will be penetrated or not, as well as the Max. dose, Min. dose and DUR of the whole item.

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