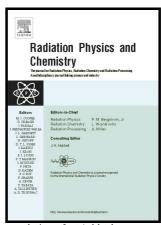
Author's Accepted Manuscript

Non-destructive inspection of hidden corrosion through Compton Back Scattering technique

M. Margret, M. Menaka, V. Subramanian, R. Baskaran, B. Venkatraman



www.elsevier.com/locate/radphyschem

PII: S0969-806X(18)30237-8

DOI: https://doi.org/10.1016/j.radphyschem.2018.07.015

Reference: RPC7943

To appear in: Radiation Physics and Chemistry

Received date: 20 March 2018 Revised date: 2 July 2018 Accepted date: 18 July 2018

Cite this article as: M. Margret, M. Menaka, V. Subramanian, R. Baskaran and B. Venkatraman, Non-destructive inspection of hidden corrosion through Compton Back Scattering technique, *Radiation Physics and Chemistry*, https://doi.org/10.1016/j.radphyschem.2018.07.015

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

ACCEPTED MANUSCRIPT

Non-destructive inspection of hidden corrosion through Compton Back Scattering technique

M.Margret a*, M.Menakab, V.Subramanian, R.Baskaran, B.Venkatraman

^aRadiological Safety Division, Indira Gandhi Centre For Atomic Research, Kalpakkam-603102, India

^bQuality Assurance Division, Indira Gandhi Centre For Atomic Research, Kalpakkam-603102, India

^cDirector, Health, Safety and Environment Group, Indira Gandhi Centre For Atomic Research, Kalpakkam-603102, India

*Corresponding author: mag@igcar.gov.in

ABSTRACT:

The purpose of this study is to investigate the hidden corrosion at selected sites in corrosion simulated Mild Steel using information from the Compton scatterd gamma rays. The proposed non-contact method employs ¹³⁷Cs source and an HPGe detector as part of practical framework and it is integrated with the MCA system. The scattered gamma rays reflecting the corrosion is mapped in real time during the scanning of the specimen. Point by point scanning is carried out to acquire the pulse height spectrum and datas are used to determine the thickness of known test object and hence thickness calibration is attained. With the calibration as a basis, hidden corrosion at the sub surfaces is detected and analysed. A reconstruction algorithm is explicated for this proposed work with a good precision of corrosion quantification in the subsequent layers. The precision is comparable with the radiography and transmission results. Experimental measurements and their results strongly confirm, hidden corrosion upto a depth of 4mm (with a range of corrosion from 1.76 to 2.29mm) in Mild Steel could be detected.

KEYWORDS: Compton Scattering , Hidden Corrosion, Mild Steel, HPGe Detector, Transmission, Radiography.

Download English Version:

https://daneshyari.com/en/article/9953968

Download Persian Version:

https://daneshyari.com/article/9953968

<u>Daneshyari.com</u>