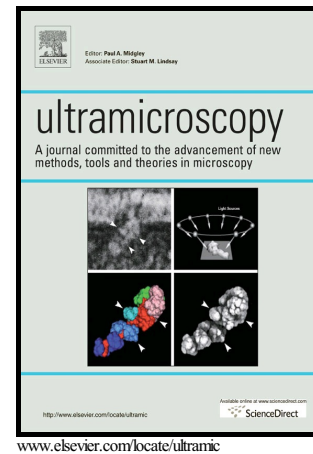


Monte Carlo modeling of Ion beam induced secondary electrons

U. Huh, W. Cho, D.C. Joy



PII: S0304-3991(16)30071-7

DOI: <http://dx.doi.org/10.1016/j.ultramicro.2016.05.010>

Reference: ULTRAM12150

To appear in: *Ultramicroscopy*

Received date: 24 June 2015

Revised date: 8 May 2016

Accepted date: 25 May 2016

Cite this article as: U. Huh, W. Cho and D.C. Joy, Monte Carlo modeling of Ion beam induced secondary electrons, *Ultramicroscopy*, <http://dx.doi.org/10.1016/j.ultramicro.2016.05.010>

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.

Monte Carlo Modeling of Ion Beam Induced Secondary Electrons

U. Huh ^{(a)*}, W. Cho ^(b), D. C. Joy ^(a, c)

^(a) Biochemistry & Cellular & Molecular Biology, University of Tennessee, Knoxville, TN 37996-0840, USA

^(b) Electrical and Computer Engineering, University of Tennessee, Knoxville, TN 37996-2100, USA

^(c) Center for Nanophase Materials Science, Oak Ridge National Laboratory, Oak Ridge, TN 37831, USA

Abstract

Ion induced secondary electrons (iSE) can produce high-resolution images ranging from a few eV to 100 keV over a wide range of materials. The interpretation of such images requires knowledge of the secondary electron yields (iSE δ) for each of the elements and materials present and as a function of the incident beam energy. Experimental data for helium ions are currently limited to 40 elements and six compounds while other ions are not well represented. To overcome this limitation, we propose a simple procedure based on the comprehensive work of Berger et al. Here we show that between the energy range of 10 keV to 100 keV the Berger et al data for elements and compounds can be accurately represented by a single universal curve. The agreement between the limited experimental data that is available and the predictive model is good, and has been found to provide reliable yield data for a wide range of elements and compounds.

*Corresponding Author: Tel: +1 919 538 2320; E-mail: uhuh@vols.utk.edu

Keywords: Monte Carlo; Secondary electron; Yield; Ion beam; Stopping power; Ion microscope;

Download English Version:

<https://daneshyari.com/en/article/8037875>

Download Persian Version:

<https://daneshyari.com/article/8037875>

[Daneshyari.com](https://daneshyari.com)