Electronic Supplementary Information

The ratio between the energy loss and the depth is calculated with the algorithm:

$$
\begin{aligned}
E_i^{in} &= E_{i-1}^{in} - \frac{\Delta d}{\cos(\theta + 12°)} \cdot Sp\left(E_{i-1}^{in}\right) \text{ with } i = 1 \text{ to } n \\
E_0^{in} &= E_0 \\
d &= n \cdot \Delta d \qquad (1) \\
E_0^{in} &= k_1 \cdot E_n^{in} - Q_{in} \\
E_j^{out} &= E_{j-1}^{out} - \frac{\Delta d}{\cos(\theta)} \cdot Sp\left(E_{j-1}^{out}\right) \text{ with } j = 1 \text{ to } n
\end{aligned}
$$

where

E_0:primary energy *of the projectile*

E_i^{in}:energy of the projectile after passing the i*th* layer on the way into the bulk

Δd:thickness of the n layer

d:depth

E_0^{out}:energy of the projectile after back scattering

k:kinematic factor of the energy loss during back scattering [7]

E_i^{out}:energy of the projectile after passing the j*th* layer on the way back to the surface

Sp:stopping power

θ:angle between the surface normal and the direction to the detector, where $78° - \theta$ is the angle between the direction of the impinging ions and the surface, *the angle of incidence*