

5

Area you using
 Insert Object
 microscopic Equations?

A) Conservation of Energy

Energy of Alpha particle before = Energy of Alpha particle after + Energy of surface atom

Since there is no potential energy:

KE of Alpha particle before = KE of Alpha particle after + KE of the surface atom

$$\frac{1}{2} M_{\alpha} (V_{\alpha, \text{before}})^2 = \frac{1}{2} M_{\alpha} (V_{\alpha, \text{after}})^2 + \frac{1}{2} M_{\text{surface}} (V_{\text{after}})^2$$

your Equations

B) Conservation of Momentum in the X direction

(Momentum_{X-before} Alpha) = (Momentum_{X-after} Alpha) + (Momentum_{X-after} Surface Atom)

$$M_{\alpha} (V_{X, \text{before}}) = M_{\alpha} (V_{X, \text{after}}) + M_{\text{surface}} (V_{X, \text{after}})$$

please use c.f. APS APA

TPS on APA

C) Conservation of Momentum in the Y direction

(Momentum_{Y-before} Alpha) = (Momentum_{Y-after} Alpha) + (Momentum_{Y-after} Surface Atom)

$$M_{\alpha} (V_{Y, \text{before}}) = M_{\alpha} (V_{Y, \text{after}}) + M_{\text{surface}} (V_{Y, \text{after}})$$

After the alpha particles collide with the surface atoms, they are reflected back and a detector measures the energy of these alpha particles. This energy is compared to the original energy of these particles before the collision with the surface atoms through a kinematic factor (K). K is just the ratio of energy after to the energy before ($K = E_{\alpha}/E_{\alpha 0}$). Using this energy and the three equations listed above, the mass of the surface atoms can be determined and consequently identified through atomic mass and the periodic table. K is related to mass of the alpha particle and the surface atoms by the following relation:

$$K = 1 - \frac{2(M_{\alpha} \times M_{\text{surface}})}{(M_{\alpha} + M_{\text{surface}})^2} \times (1 - \cos \theta)$$

where θ is the angle of scattering

what energy?

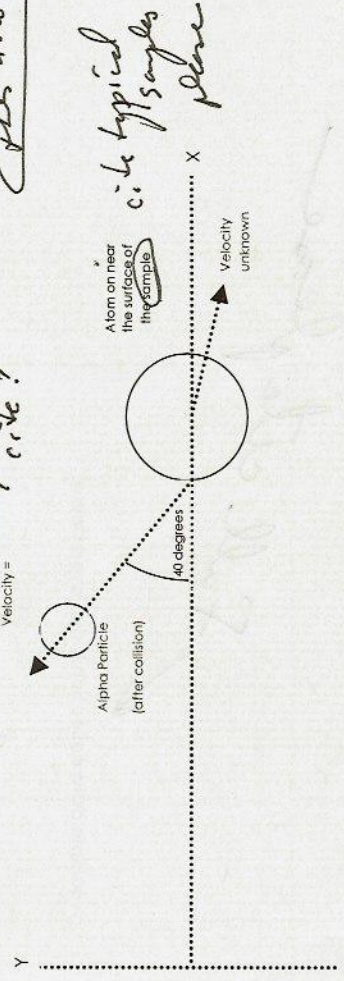
the collision

this is shall 3 ps. Shall they be a, b, c?

6. In an elastic collision energy and momentum are conserved. What is the total momentum in the X direction for the system of alpha particle and surface atom after the collision? What is the total momentum in the Y direction for the system of alpha particle and surface atom after the collision? What is the total energy of the system of alpha particle and surface atom after the collision?

what's going on this time?

Part IV New S: situation: describe maybe even c.f. c?



1. With the velocity provided determine the vertical component of the Alpha particle's velocity.

2. With the velocity provided determine the horizontal component of the Alpha particle's velocity.

Should this be earlier in the article, before the sample problems? Using the concepts of conservation and energy we arrive at three separate equations:

on n of (either is good, justifiably) show sample called?