coefficient of restitution (COR)

collision

$$COR = \frac{v_{after}\,(relative)}{v_{before}\,(relative)} = \sqrt{\frac{KE_{after}}{KE_{before}}}$$

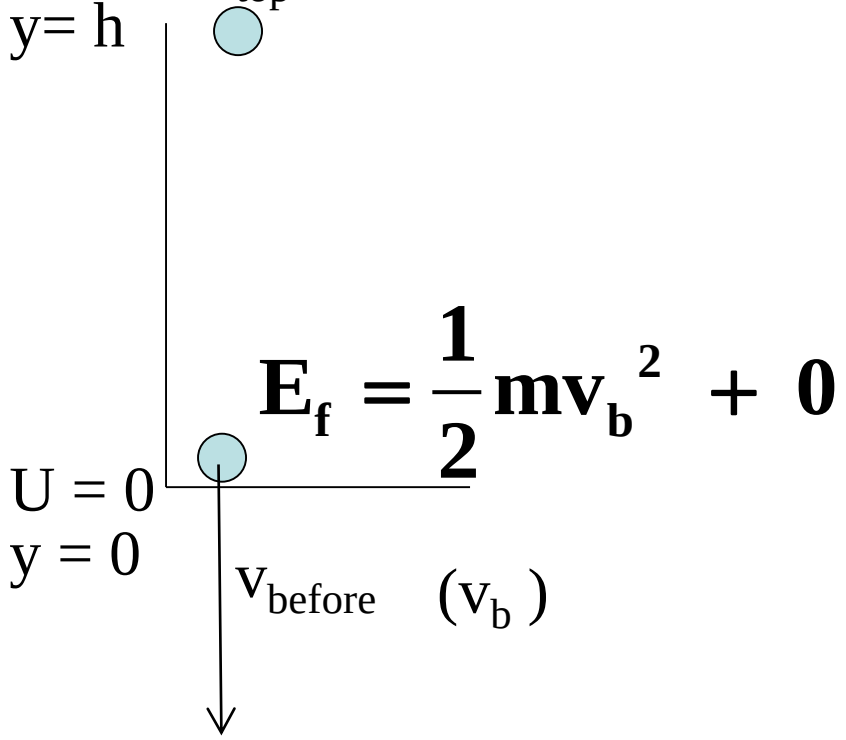
Bounce off earth surface (assumptions…)

$$COR = \sqrt{\frac{h'}{h}}$$

$E_i = 0 + mgh$

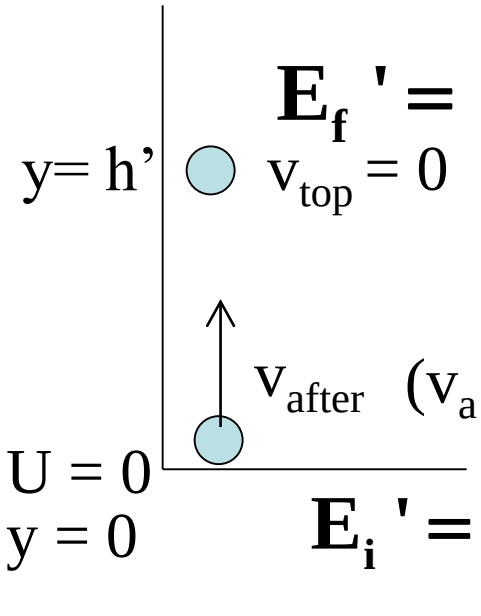
$v_{top} = 0$

y= h



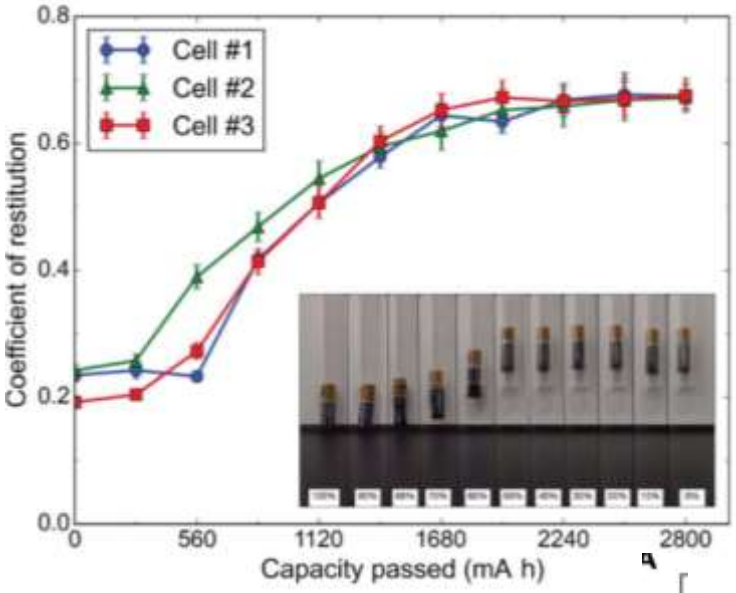
$E_f' = 0 + mgh'$

y= h’ $v_{top} = 0$



"The relationship between coefficient of restitution and state of charge of zinc alkaline primary LR6 batteries" S. Bhadra, B. Hertzberg, A. Hsieh, M. Croft, J. Gallaway, B. Van Tassell, M. Chamoun, C. Erdonmez, Z. Zhong, T. Sholklapperh, D. Steingart, J. Mater. Chem. A, 2015, 3, 9395–9400 http://www.physics.rutgers.edu/~croft/papers/206a-Bhadra-bounce-bat2015.pdf https://www.eurekalert.org/pub_releases/2015-04/pues-dtb040115.php

https://www.youtube.com/watch?v=ZywsCbWEun8



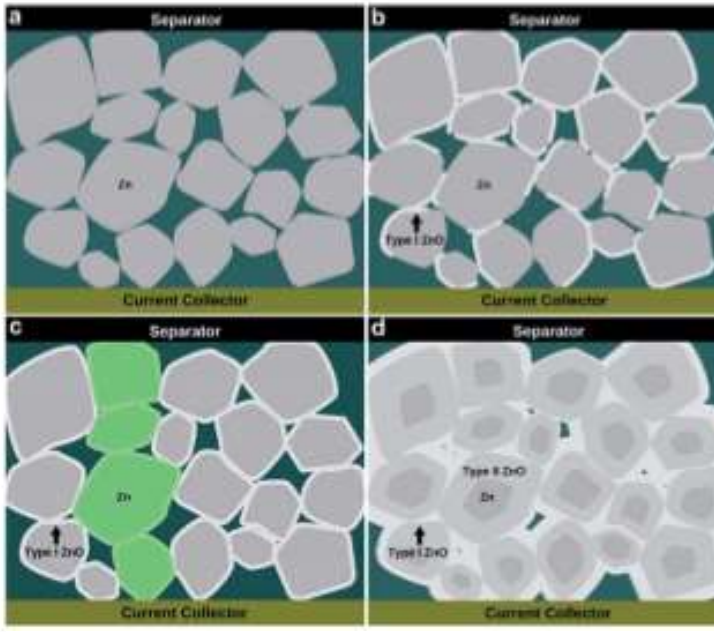
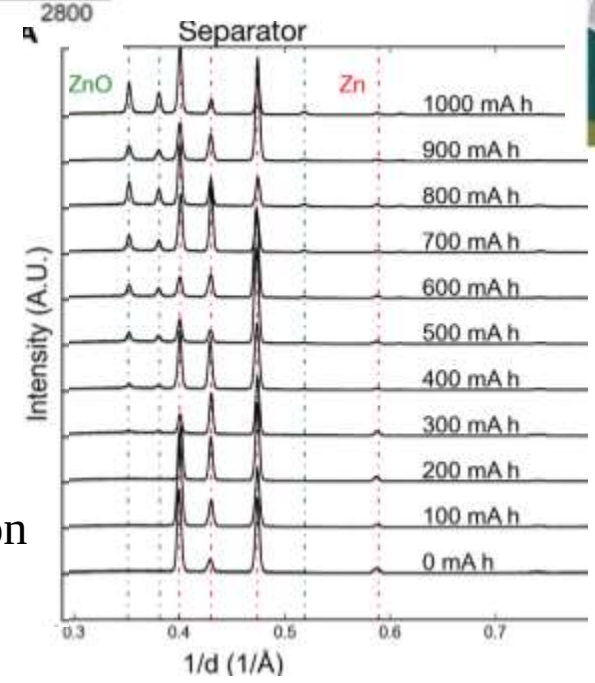


Fig. 4 The progression of ZnO formation in the anode. (a) The initial anode gel comprised of Zn particles in an electrolyte/cellulose matrix. (b) Formation of Type I ZnO shells on Zn particles. Oxidation occurs preferentially at the separator. (c) Formation of a percolation pathway. As all particles become clad in ZnO shells, a contiguous network of ZnO-clad particles forms from separator to current collector (highlighted in green). (d) Densification of the anode. Type I ZnO shells grow and Zn particles oxidize to Type II ZnO.

X-ray Diffraction



COR2