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Semiconductors**

**Materials
Reliability in
Microelectronics III**

Reflects an increased interest in dielectric reliability, diffusion barriers and corrosion, as well as the traditional metal film stress and reliability issues relevant to microelectronics. The reliability and mechanical stability of SiO₂, adhesion measurements and characterization methods for oxides and thin films are presented. The microstructure of blanked films and patterned lines, including grain size, grain size distribution and crystallographic texture, aluminum alloy additions (Cu, Fe, Mg, Pd), and the use of refractory metal layers (Ti, TiN, etc.) to improve the reliability of fine lines are emphasized. The precipitate morphology and location of the solute (i.e., within the grain or at the grain boundary) are shown to influence the electromigration behavior of Al-Cu lines. The use of 1/f noise and the detection of early resistance changes during electromigration to predict the reliability of Al films are addressed. Also presented are papers on corrosion and the passivation of Al and Cu films, diffusion barriers and silicide formation. 1993, hardcover, 67 papers, 495 pages.

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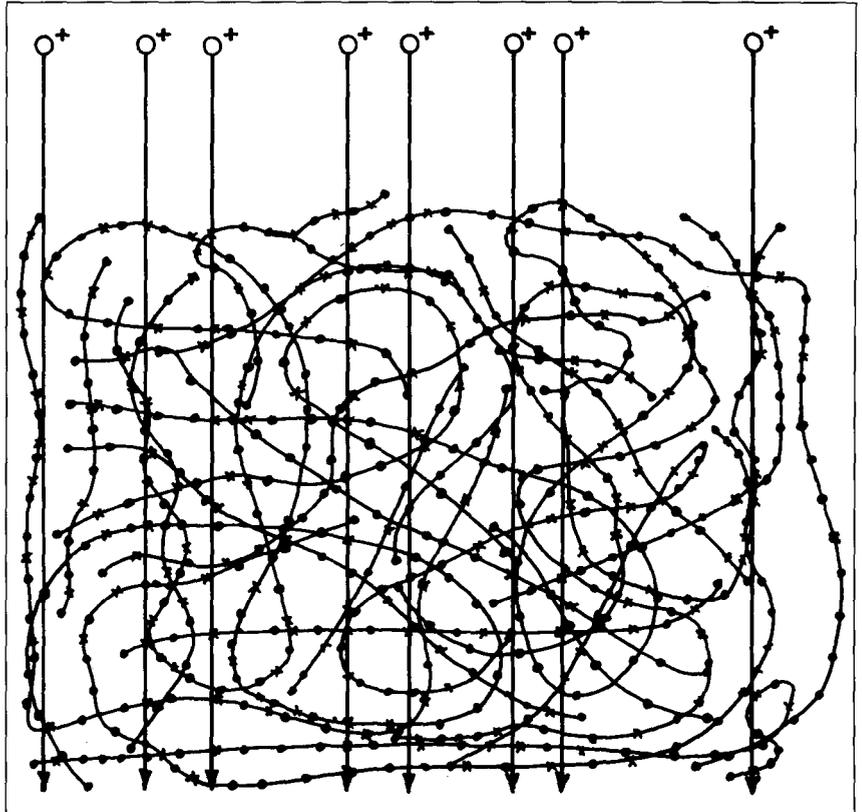
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How often have you worried about carbon depletion under irradiation? As carbon-based life, wouldn't you think that hazard should concern us? Well, not to worry. Unless your organic molecules are genetically predisposed to being highly crystalline and well oriented with respect to directions from which radiation is likely (we could not find the precise medical term for this condition), you are pretty safe. If you are still worried, may we refer you to an article by U.K. Chaturvedi, A. Patnaik, and A.K. Nigam that appeared in *Radiation Effects* **104** (1987) p. 43-50, where the depletion of carbon in ultrahigh molecular weight polyethylene as a result of radiolysis under a 340 keV beam of deuterons was studied. The authors found experimentally that much less carbon is lost than would be expected based on the number of carbon-carbon bond scissions that occur. Two reasons advanced are that (1) unless the scissions occur rapidly and repeatedly at the same site, recombinations are likely and (2) unless the scission points are close together along a molecular chain, fragments of low enough molecular weight to leave the material quickly are not formed as often. The figure reproduced in this month's EDITOR'S CHOICE, which looks more like a barbed wire barrier than polyethylene, is how these authors schematically illustrate the random occurrence of scissions (x) between the carbon atoms (•) of amorphously disposed molecular chains as deuterons (O+) penetrate (→) the material. Hence the maxim, "Oh, what a tangled web we weave, when bending bonds ions would cleave."