Dislocations and Twins

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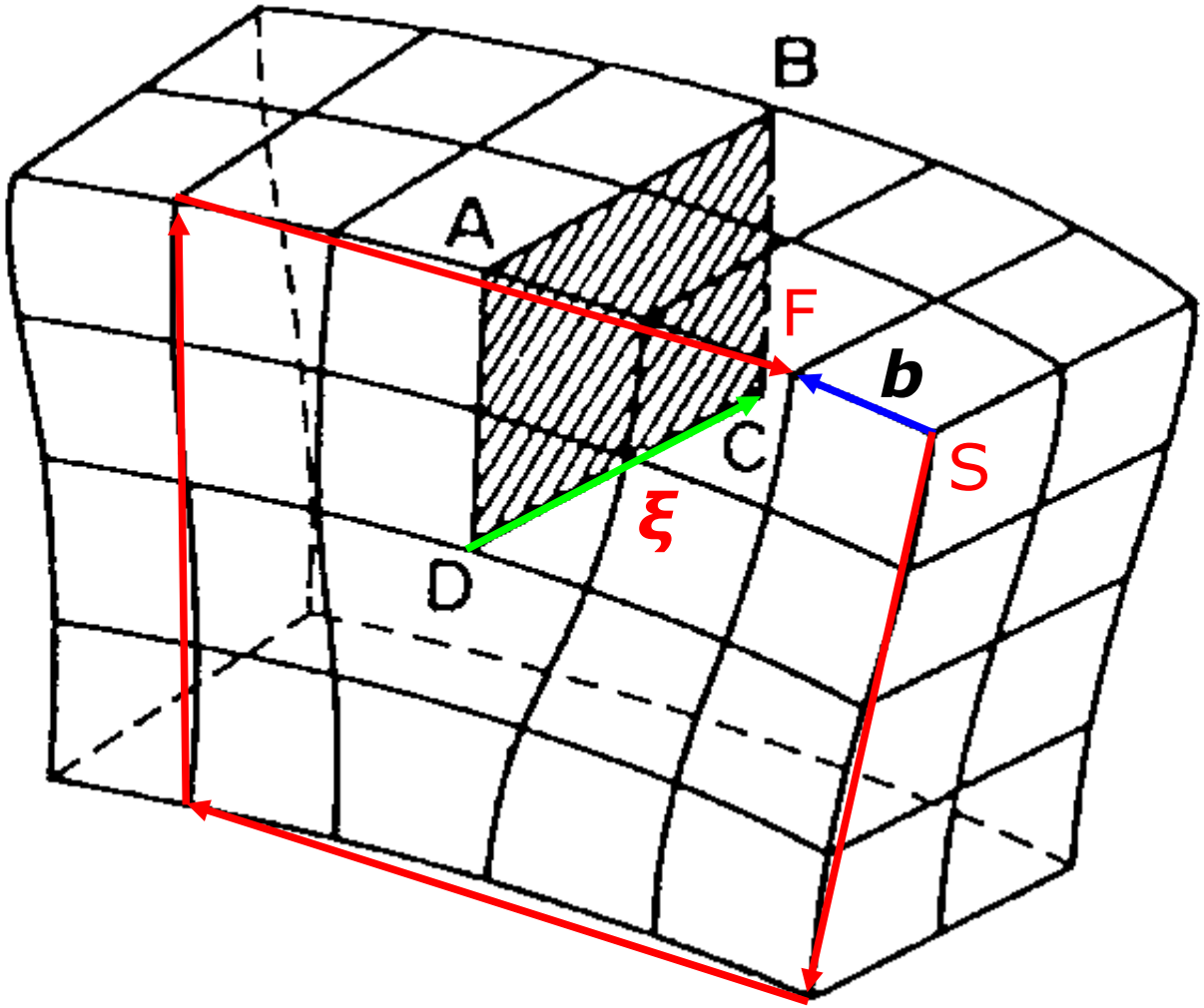
Eric M. Taleff

Lecture 11

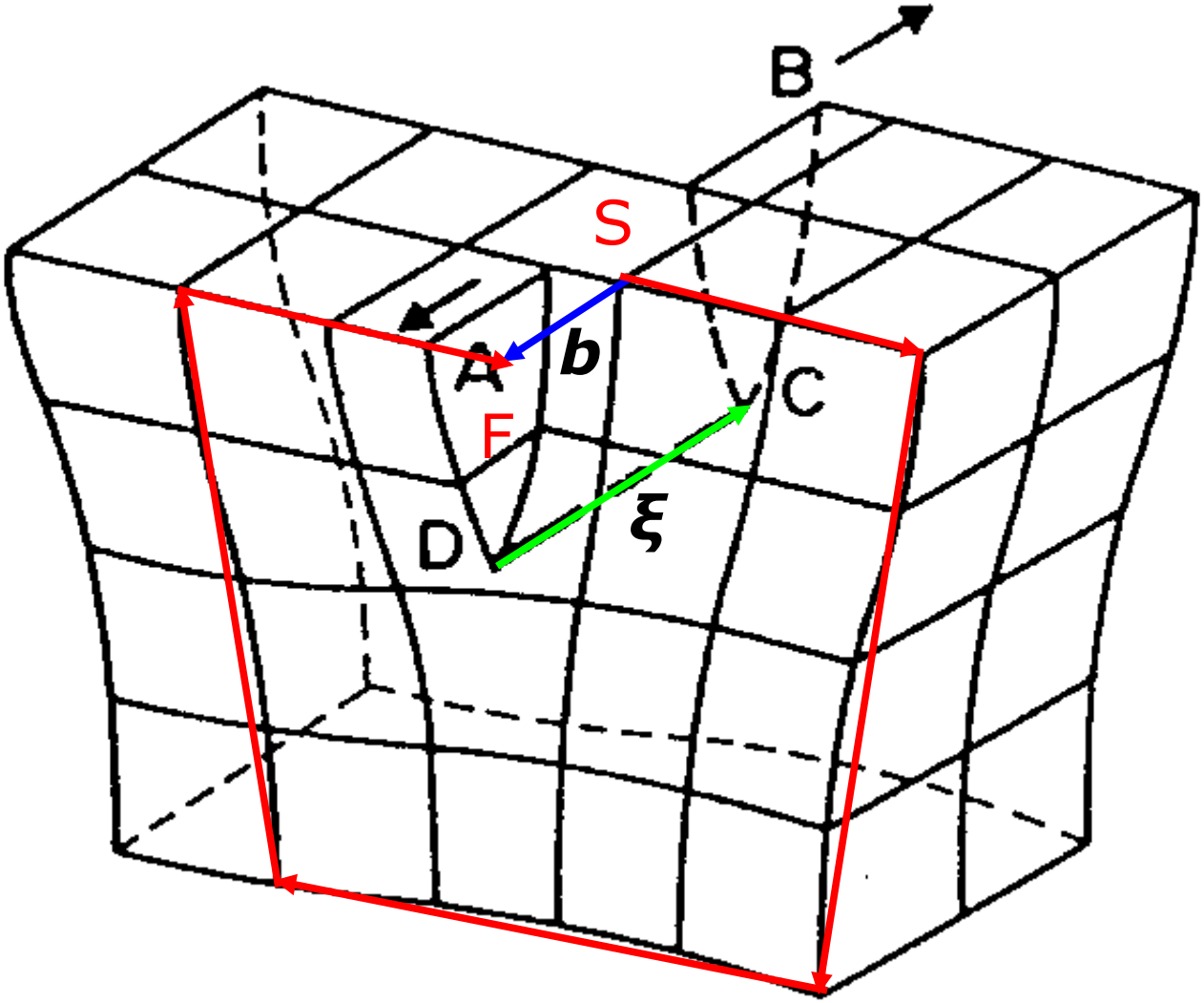
The University of Texas at Austin
Department of Mechanical Engineering
Materials Science and Engineering Program
1 University Station, C2200
Austin, TX 78712-0292

Edge Dislocation



D. Hull and D.J. Bacon, *Introduction to Dislocations* (Pergamon Press: New York) 1984.

Screw Dislocation



Experimental Observations of Dislocations

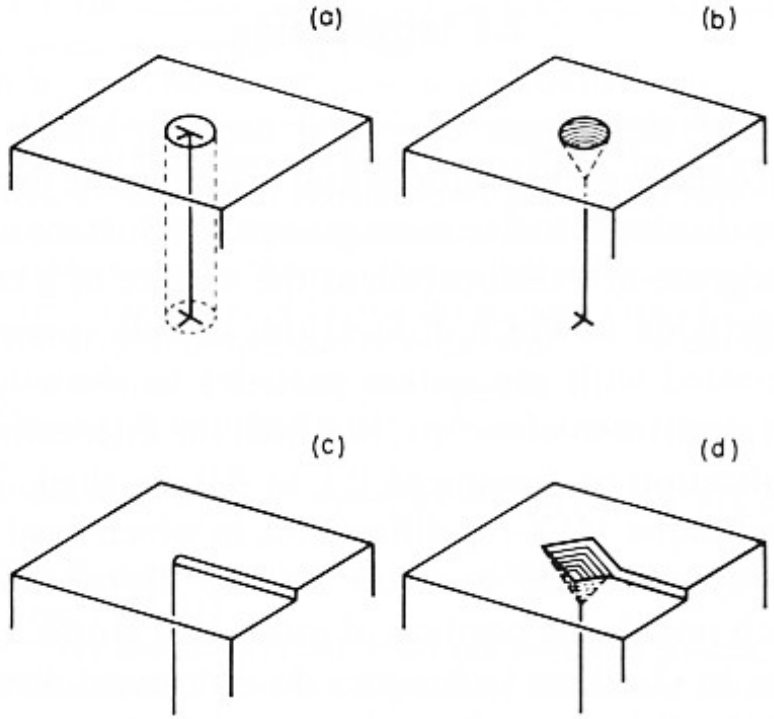


FIG. 2.1. Formation of etch pits at the site where a dislocation meets the surface. (a) Edge dislocation, the cylindrical zone around the dislocation represents the region of the crystal with different physical and chemical properties from the surrounding crystal. (b) Conical-shaped pit formed at an edge dislocation due to preferential removal of atoms from the imperfect region. (c) Emergent site of a screw dislocation. (d) Spiral pit formed at a screw dislocation; the pits form by the reverse process to the crystal growth mechanism.

D. Hull and D.J. Bacon, *Introduction to Dislocations* (Pergamon Press: New York) 1984.

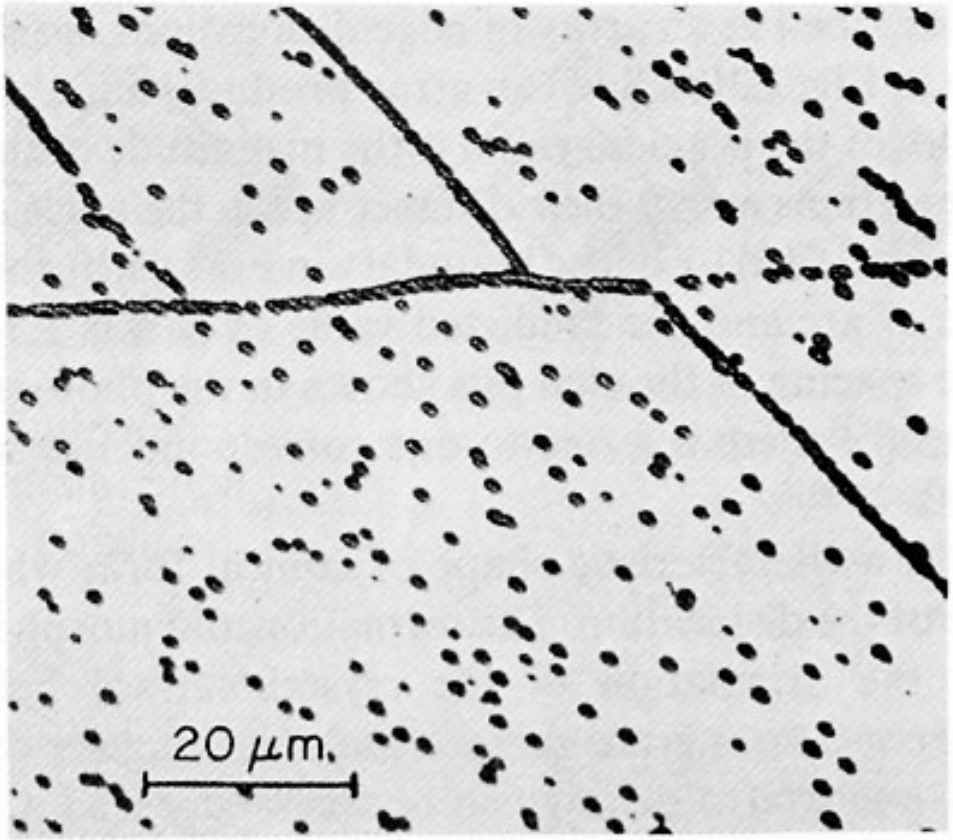
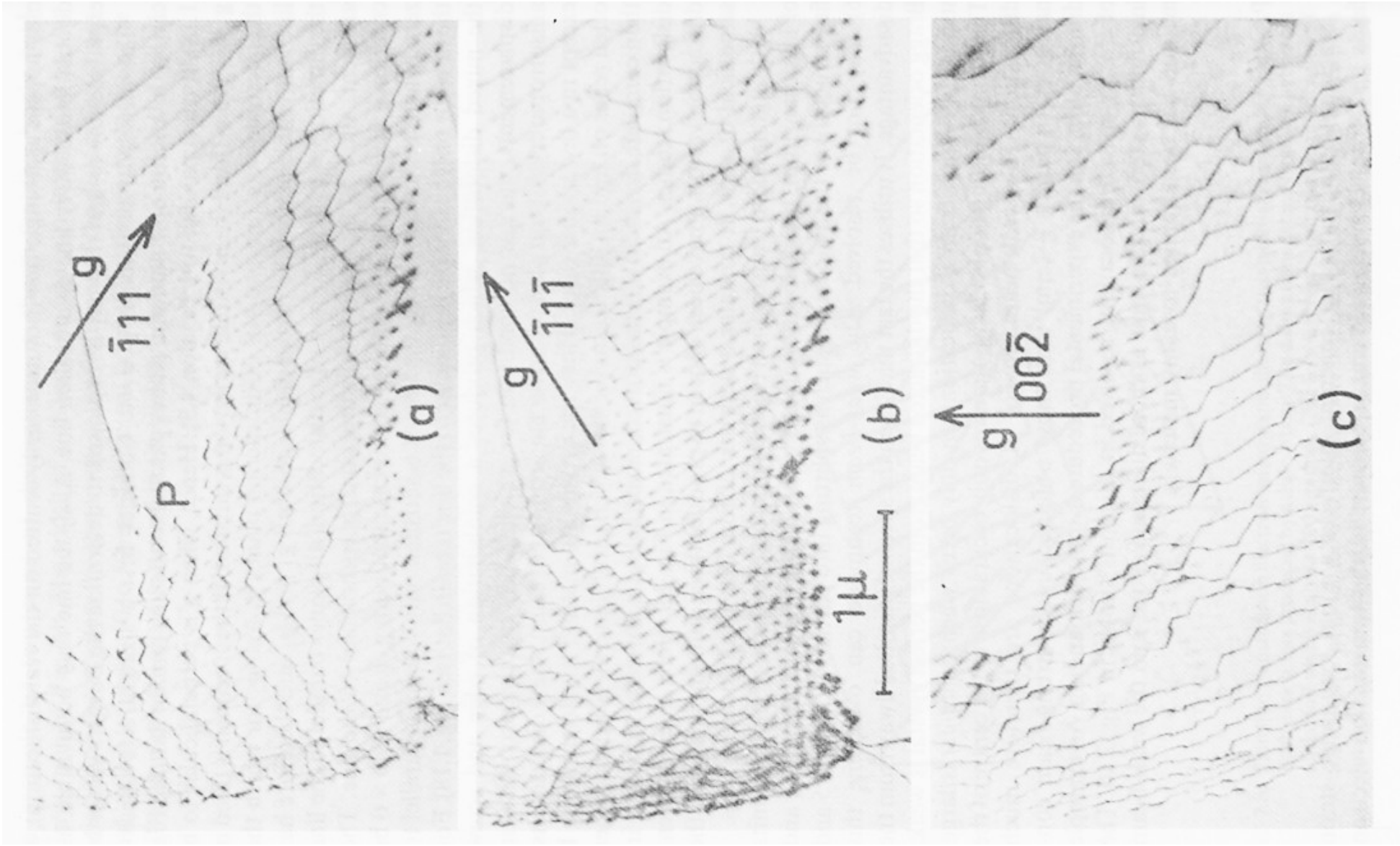


FIG. 2.2. Etch pits produced on the surface of a single crystal of tungsten. (From Schadler and Low, unpublished.)

D. Hull and D.J. Bacon, *Introduction to Dislocations* (Pergamon Press: New York) 1984.



D. Hull and D.J. Bacon, *Introduction to Dislocations* (Pergamon Press: New York) 1984.

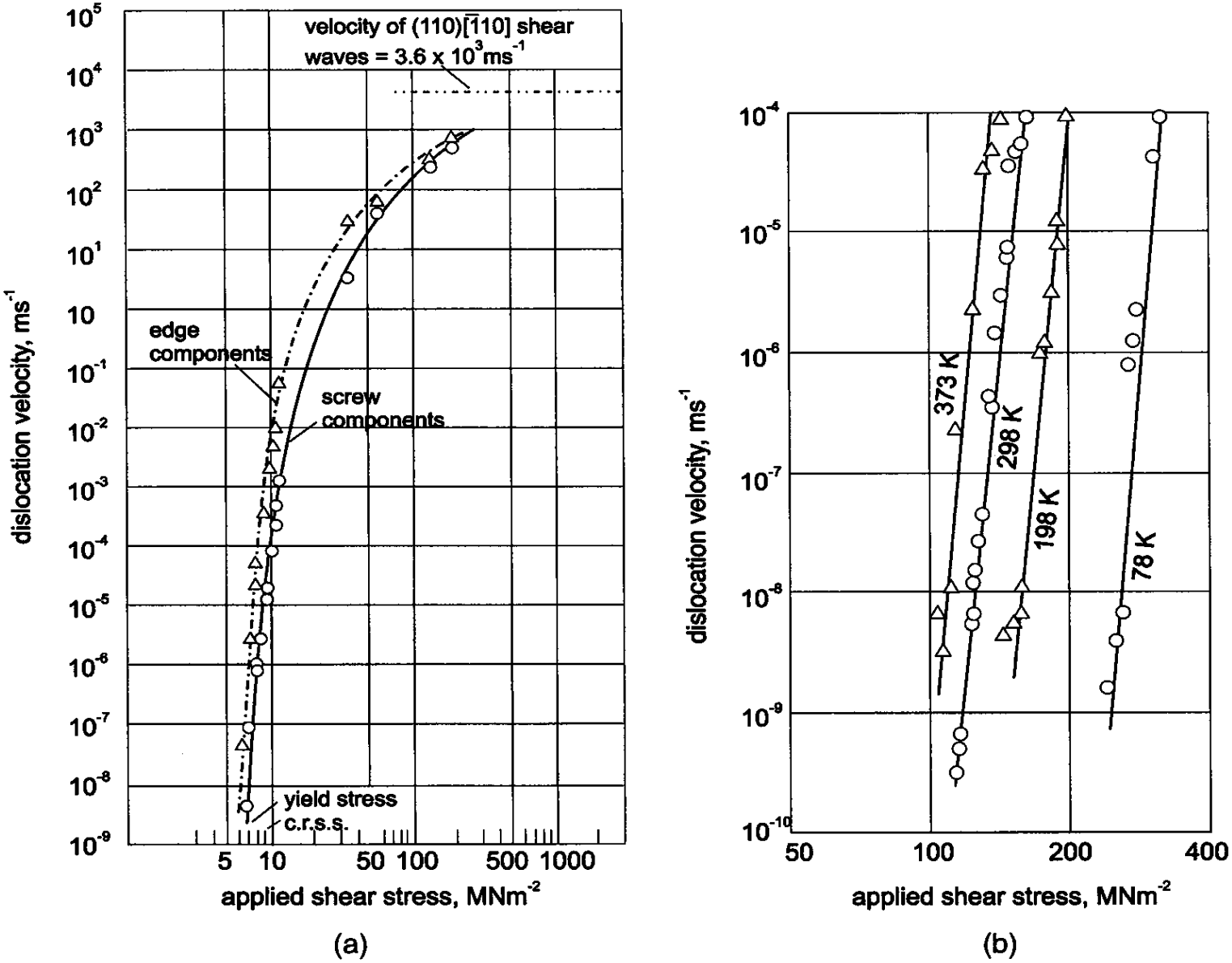


Figure 3.11 (a) Stress dependence of the velocity of edge and screw dislocations in lithium fluoride. (From Johnston and Gilman, *J. Appl. Phys.* **30**, 129, 1959.) (b) Stress dependence of the velocity of edge dislocations in 3.25 per cent silicon iron at four temperatures. (After Stein and Low, *J. Appl. Phys.* **31**, 362, 1960.)

D. Hull and D.J. Bacon, *Introduction to Dislocations* (Pergamon Press: New York) 1984.

Twin Formation

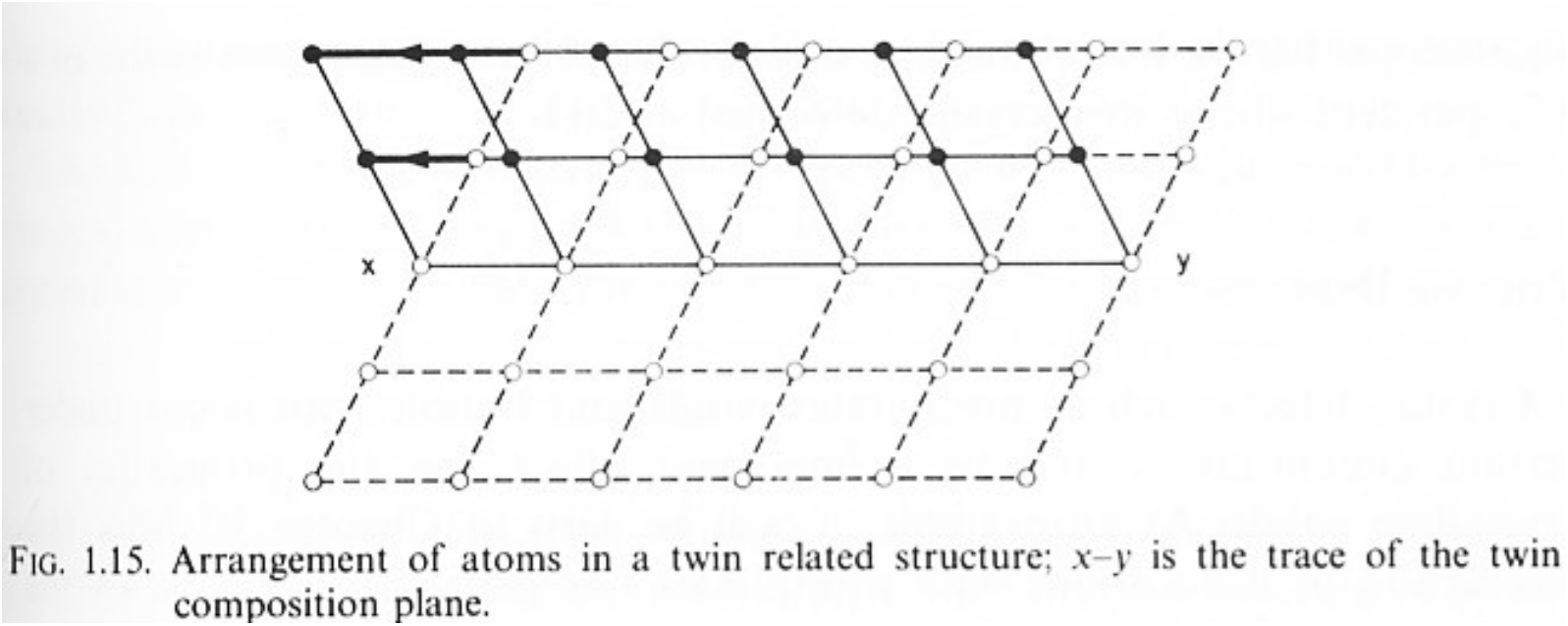


FIG. 1.15. Arrangement of atoms in a twin related structure; x–y is the trace of the twin composition plane.

D. Hull and D.J. Bacon, *Introduction to Dislocations* (Pergamon Press: New York) 1984.

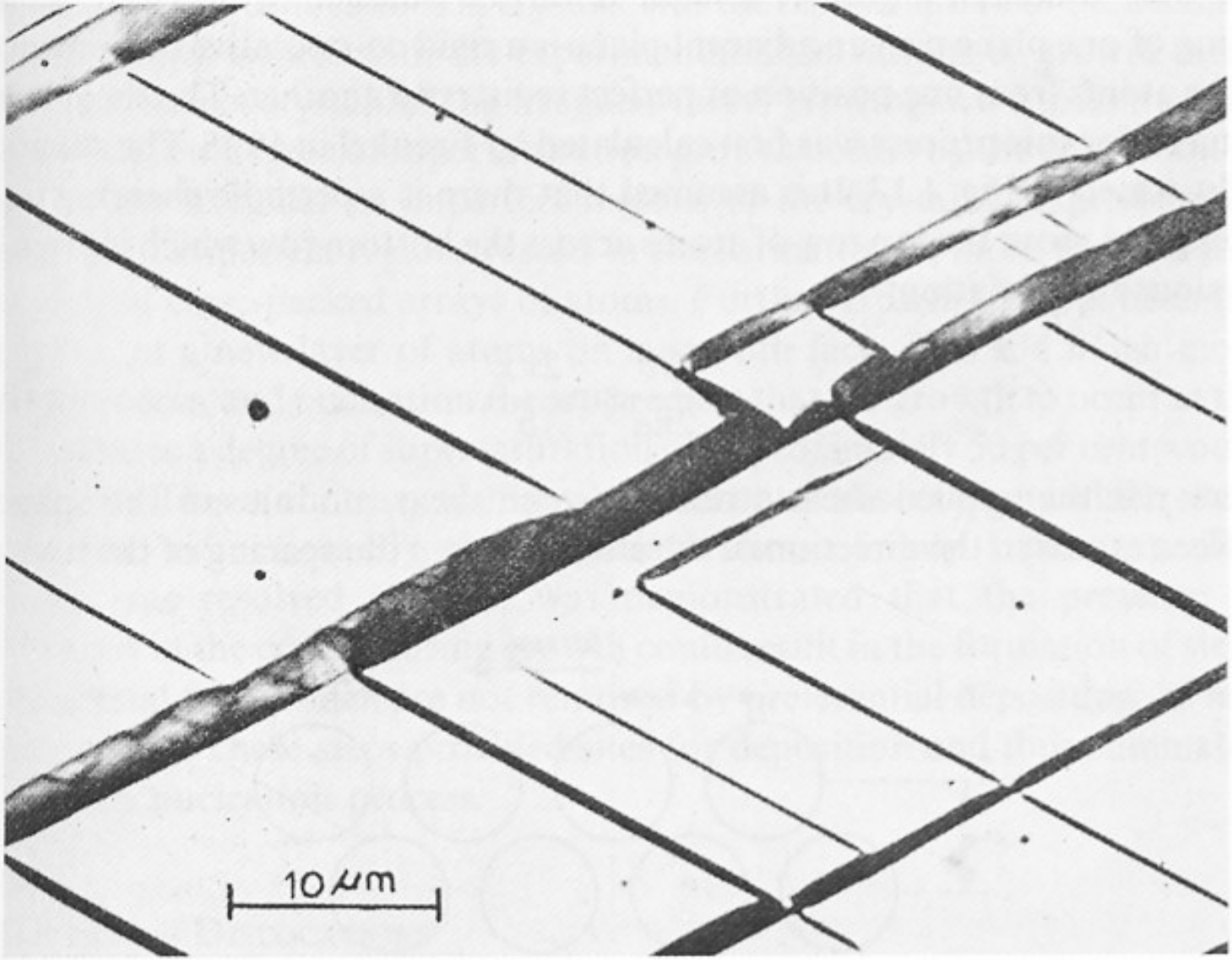


FIG. 1.16. Deformation twins in 3.25 per cent silicon iron. The surface at the twins is tilted so light is reflected in a different direction.

D. Hull and D.J. Bacon, *Introduction to Dislocations* (Pergamon Press: New York) 1984.