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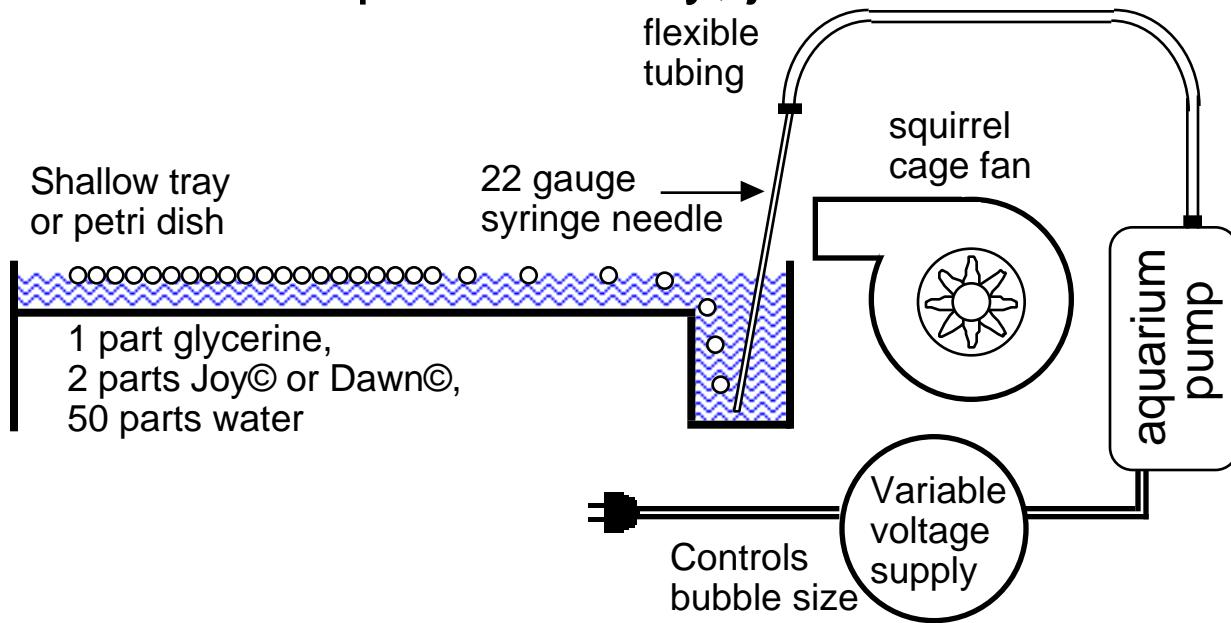
Laboratory Safety

DISCLAIMER

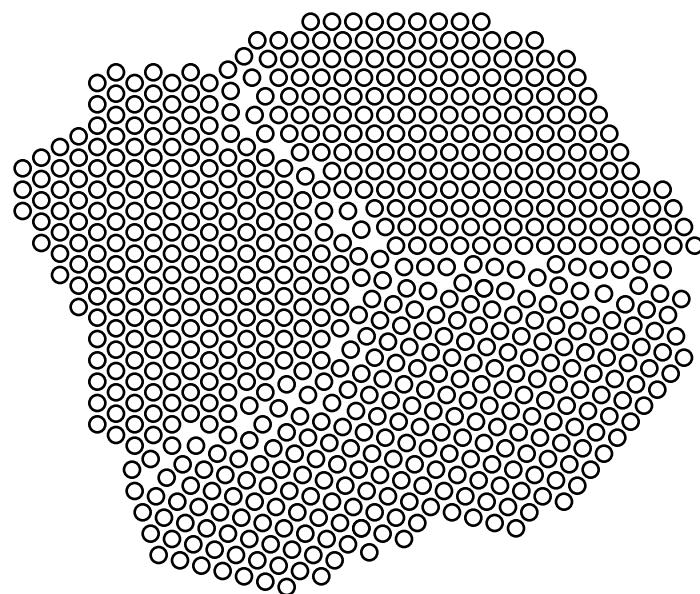
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Bubble Raft

Small bubbles are attracted to each other to form a close packed array, just like metal atoms.



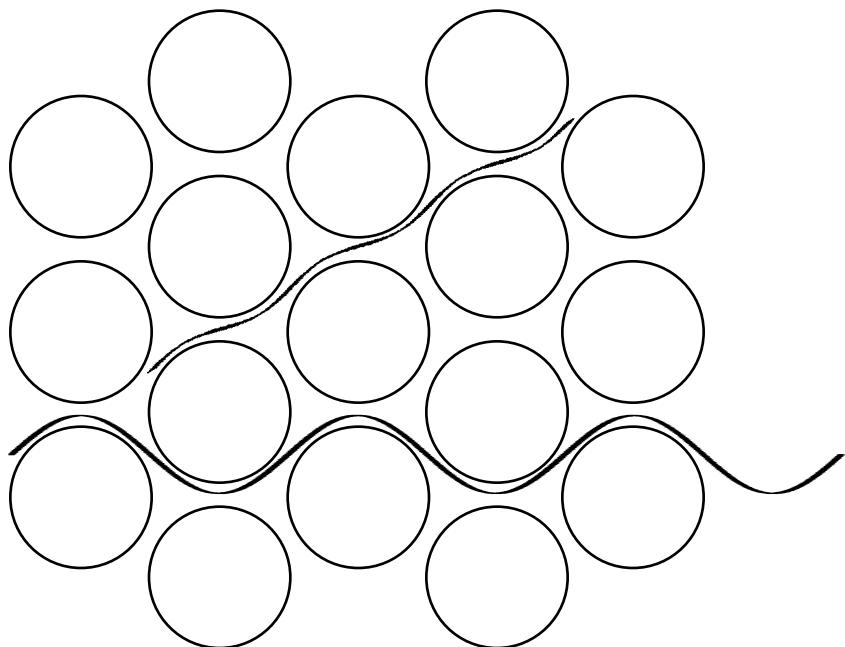
Grains in a polycrystalline material:



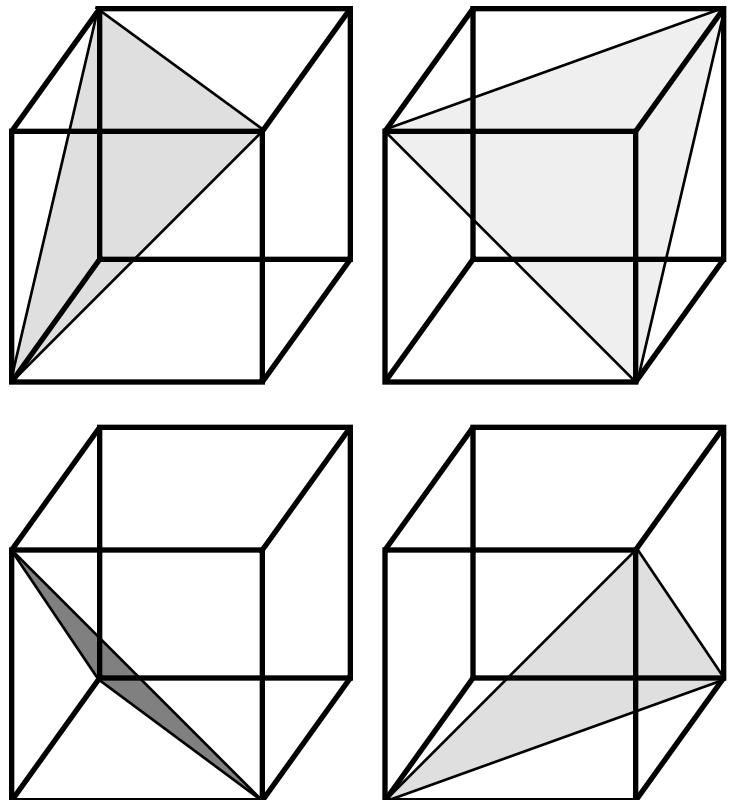
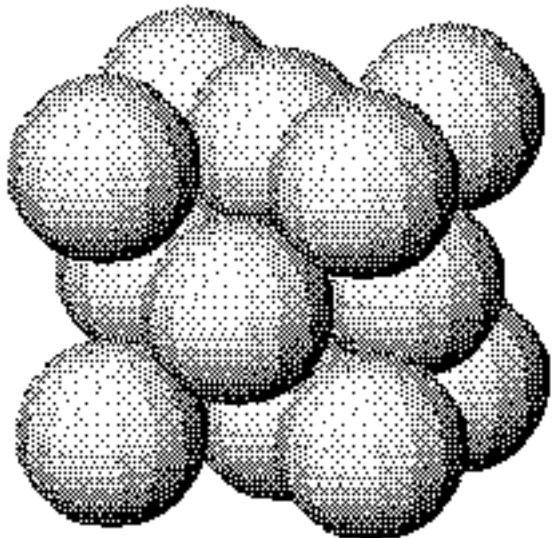
Every grain boundary is an array of dislocations.

Slip Planes

Movement along close-packed slip planes requires less energy.

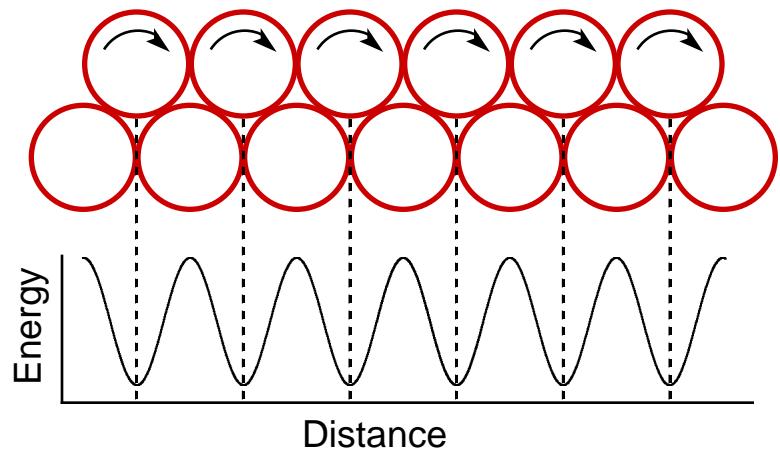


Face-centered cubic metals have four sets of close-packed slip planes.

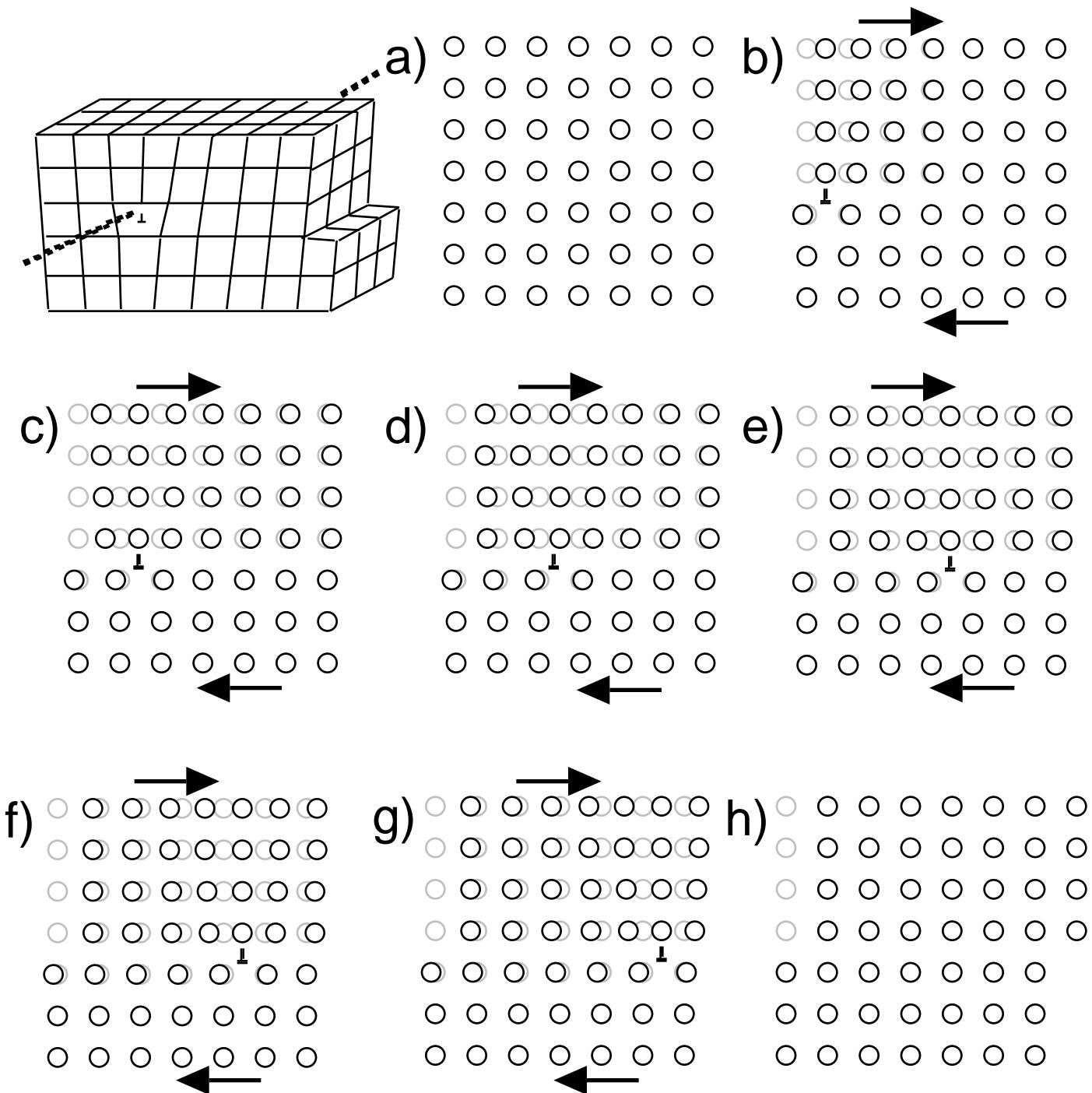


Slip Energy

Potential energy diagram for sliding one row of spheres across another row.



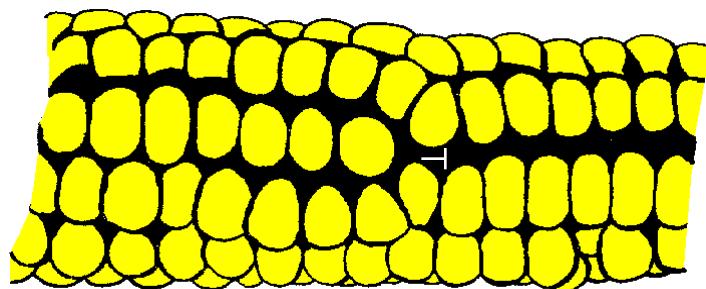
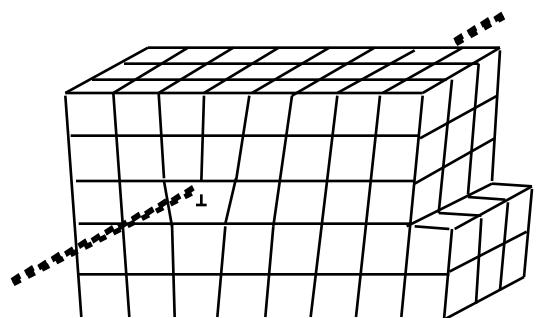
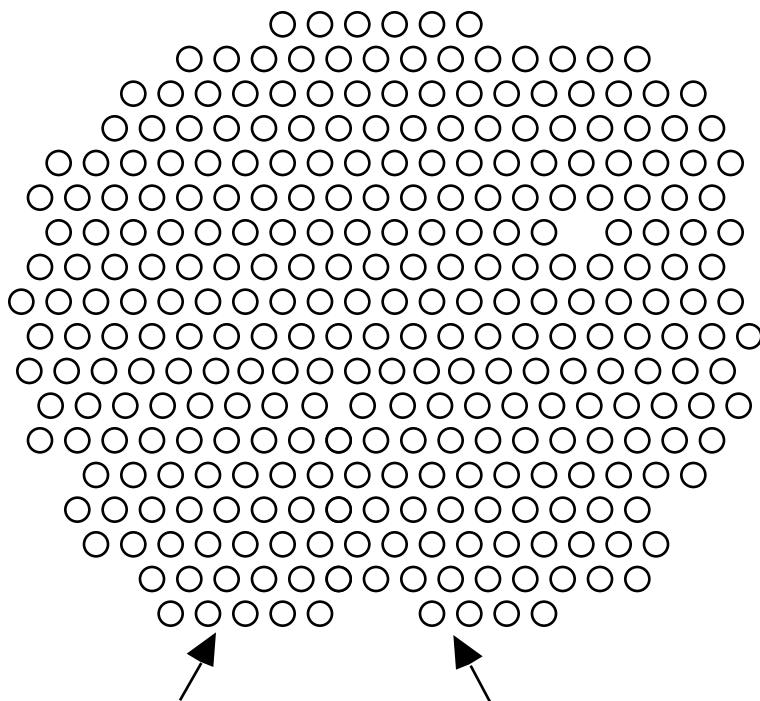
Dislocation Movement



When a crystal is subject to a shearing force, dislocations move along crystallographic slip planes.

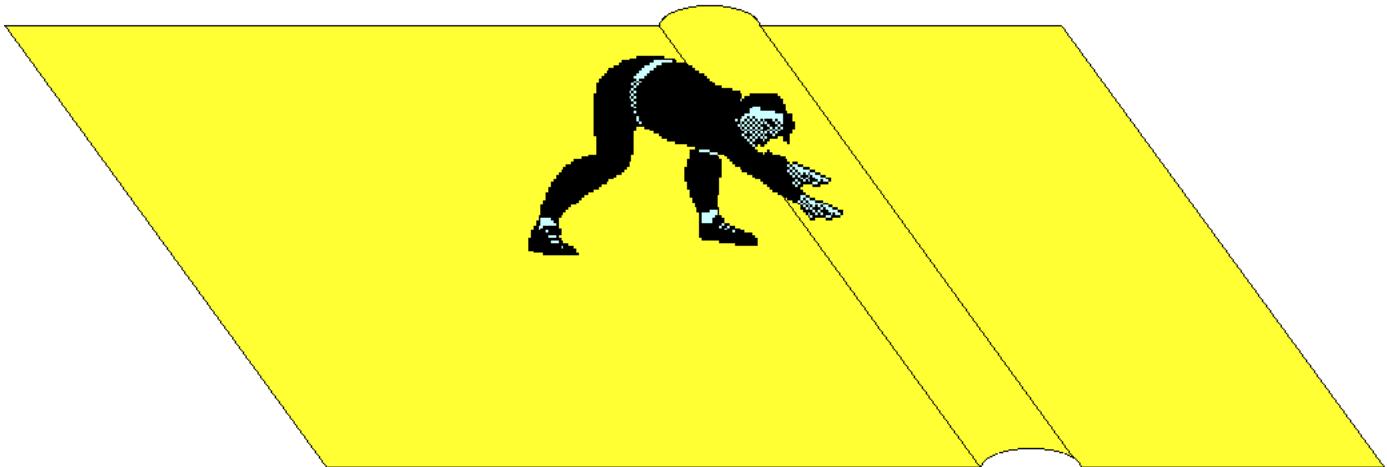
Dislocations

Arrays of bubbles and arrays of metal atoms have similar mechanical properties due to dislocations.

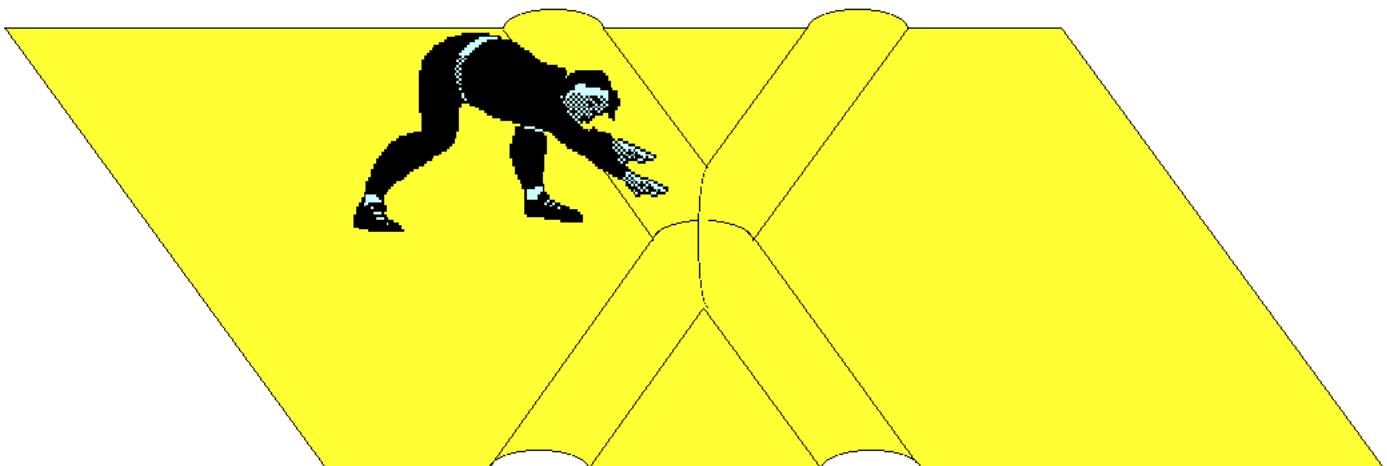


Dislocations and Work Hardening

Dislocation

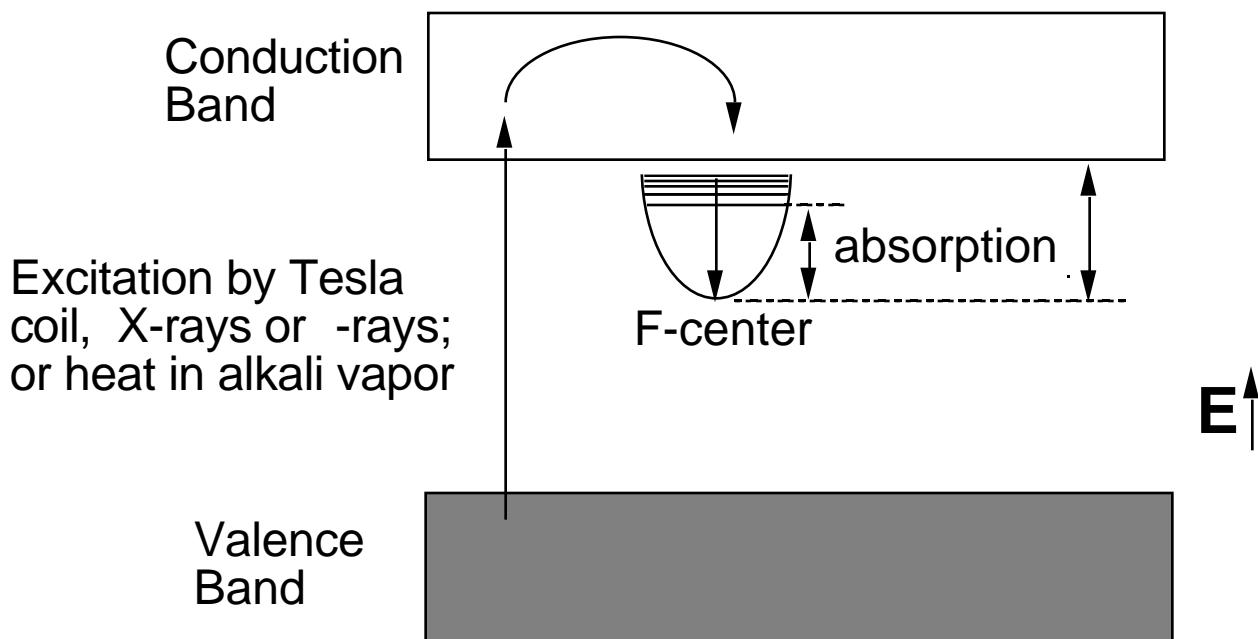
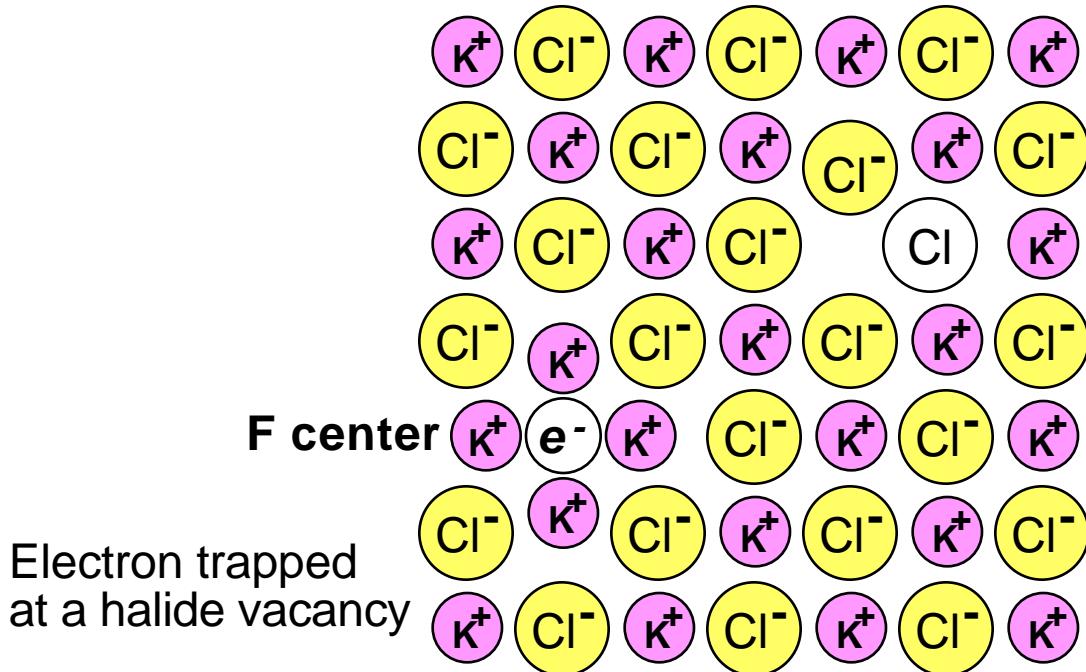


Work Hardening

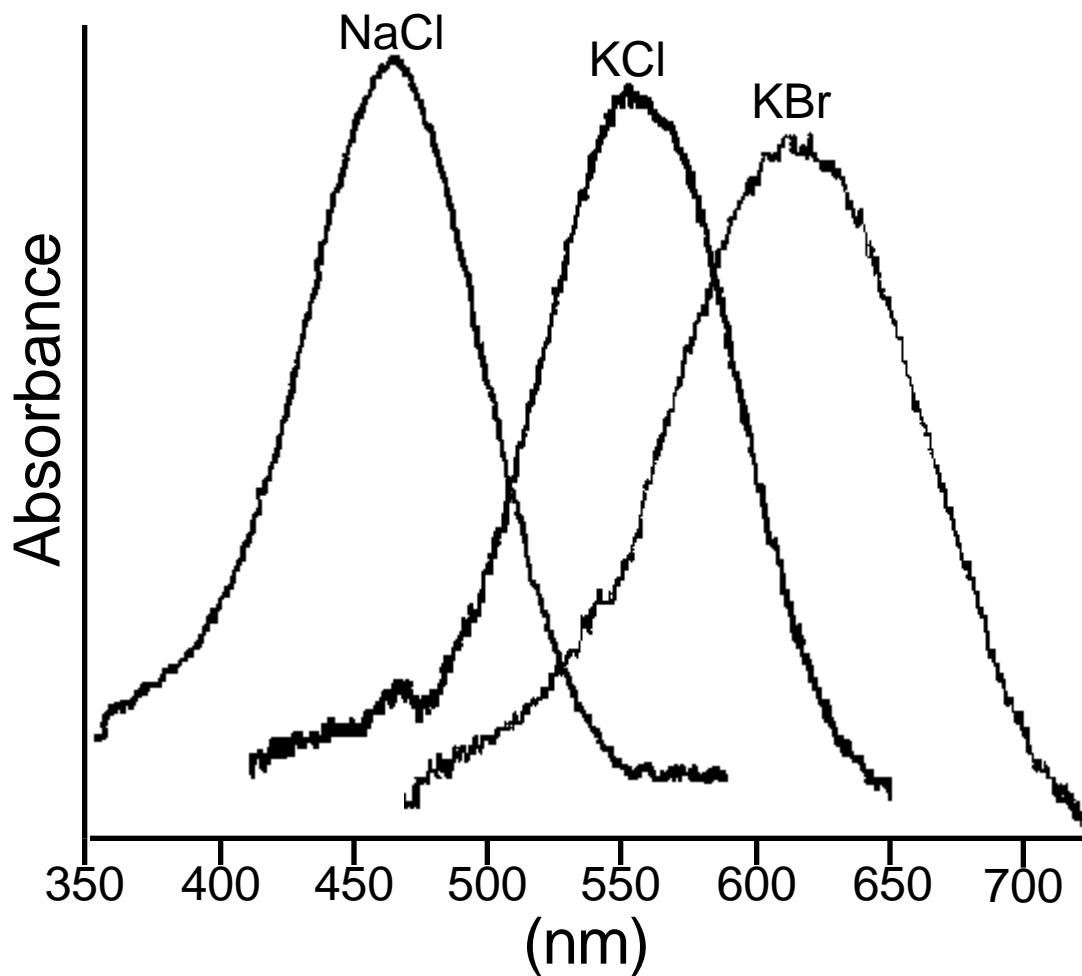
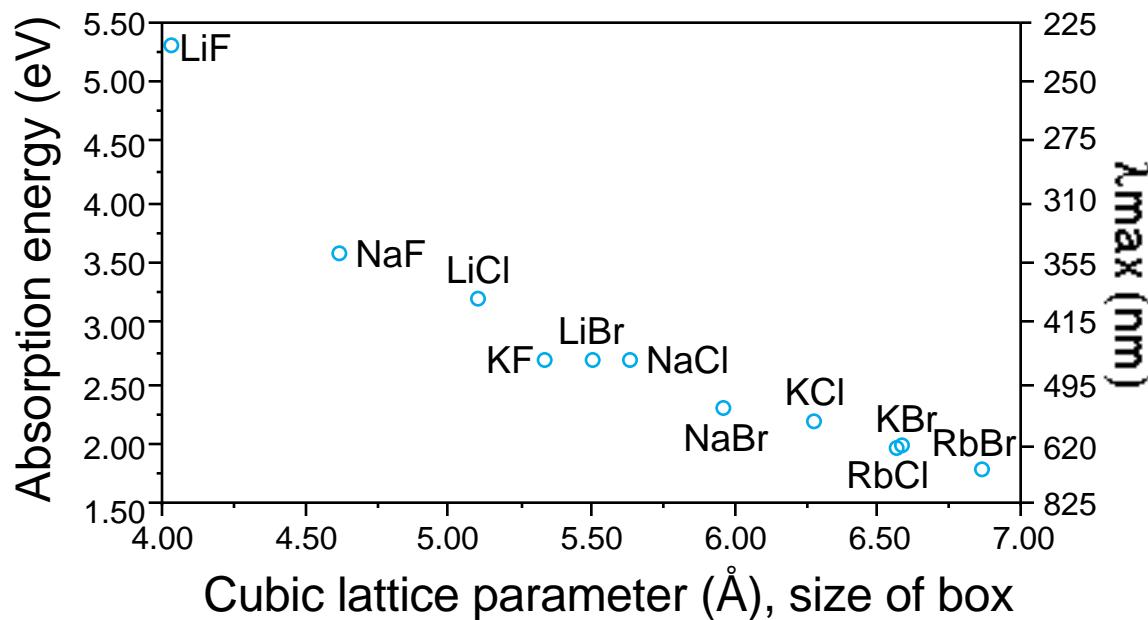


Color Centers

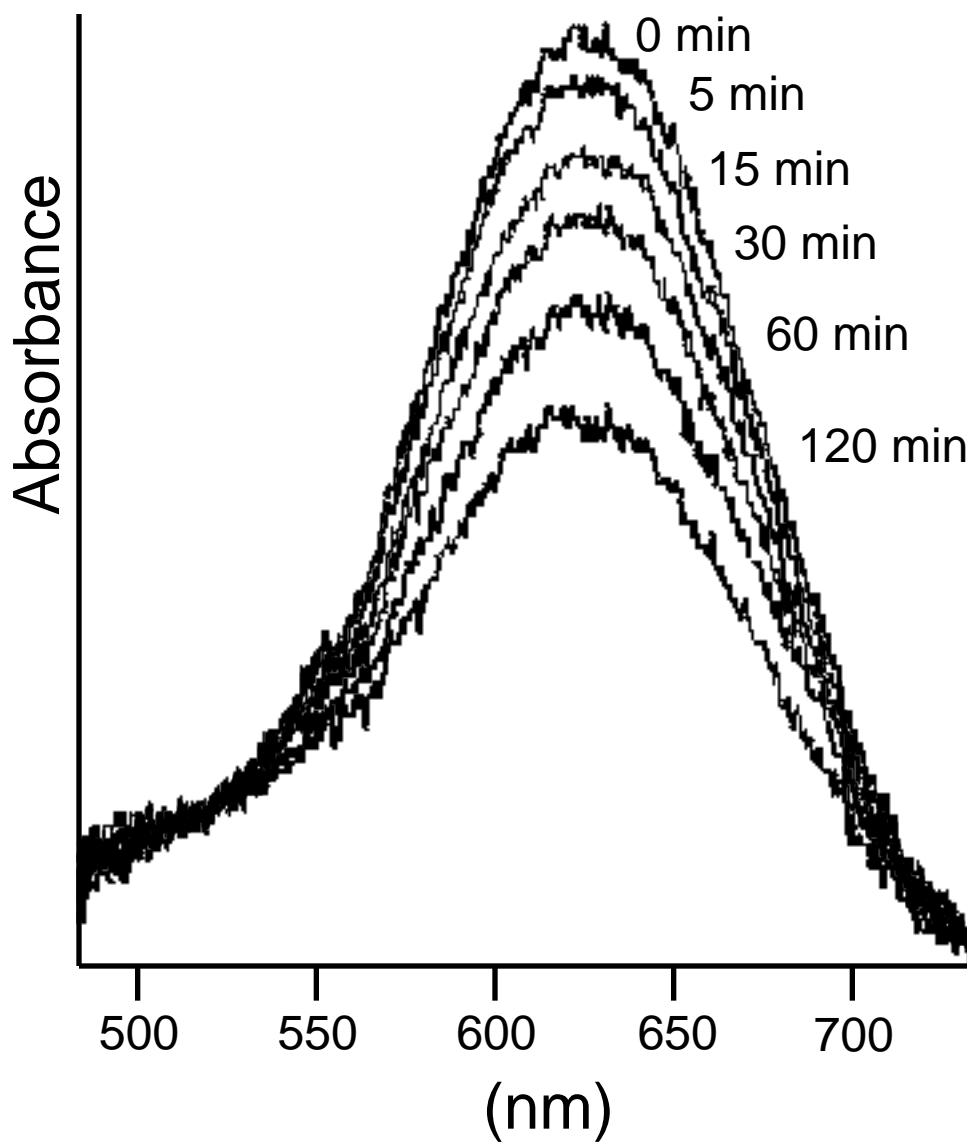
(F centers: from the German word Farbe for color)



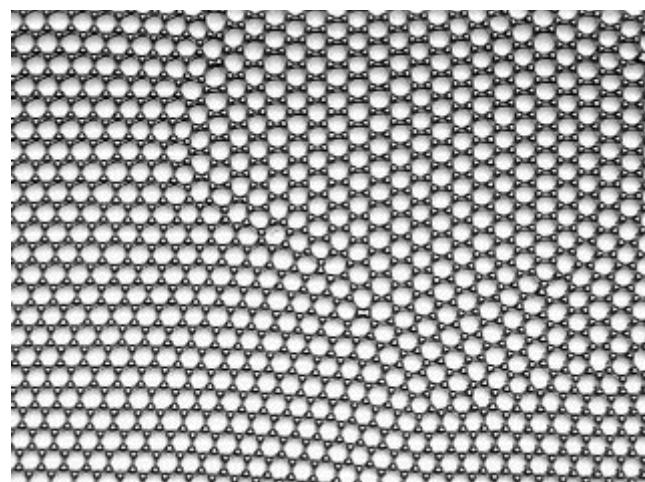
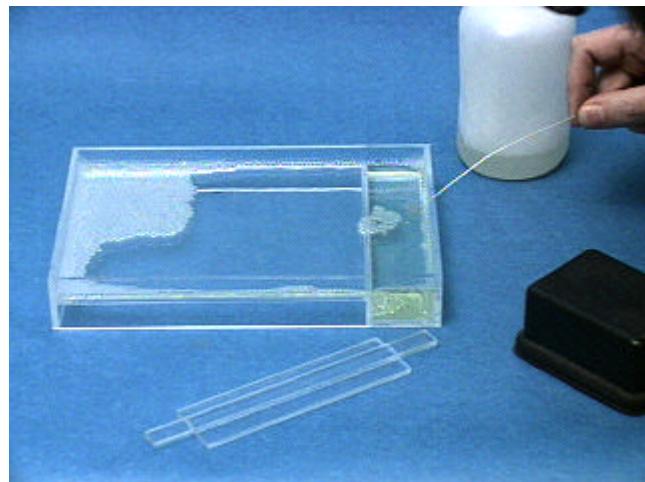
Particle in a Cubic Box



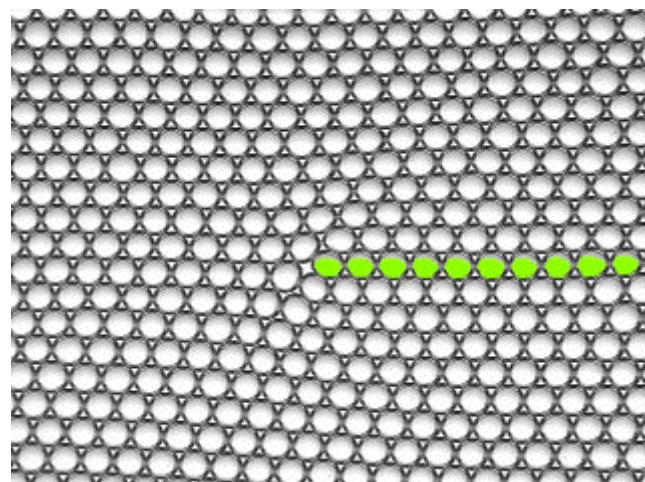
Decay of KBr F-center



Bubble Raft

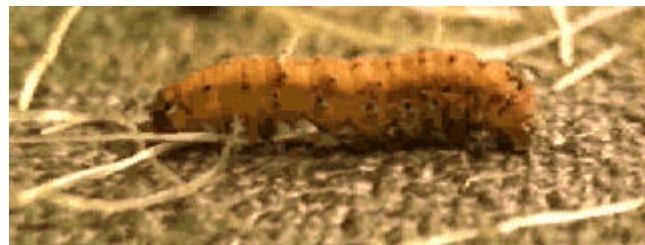


Grain Boundary

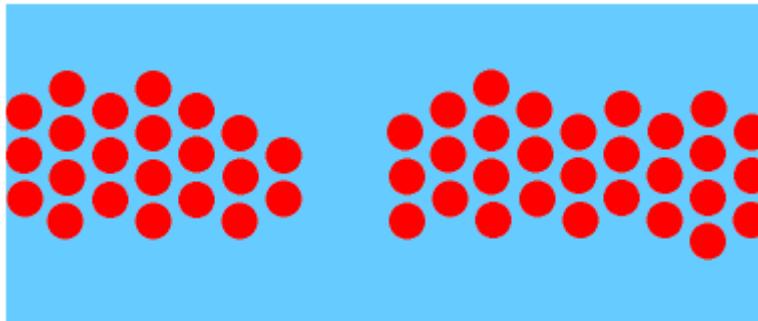
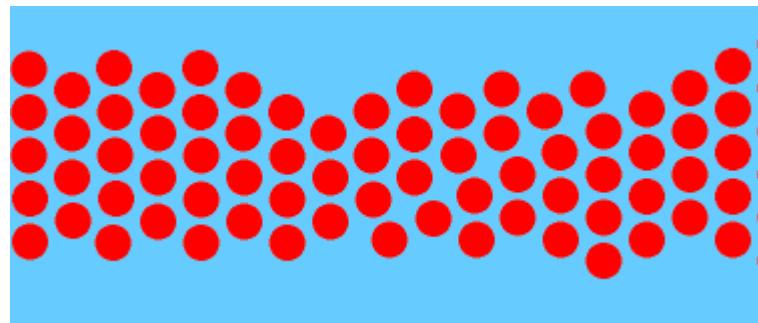
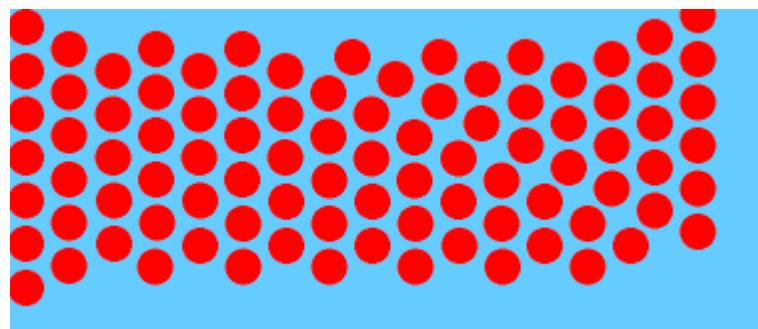
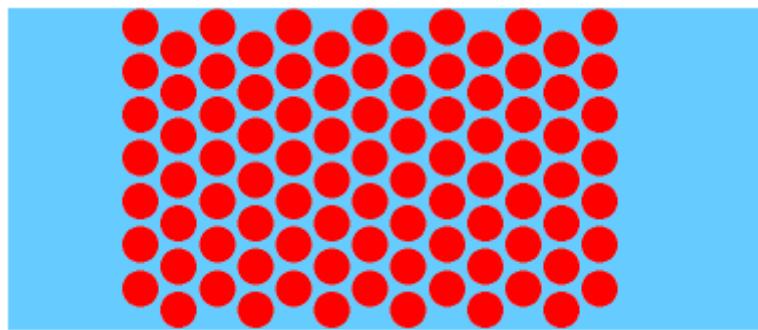


Dislocation

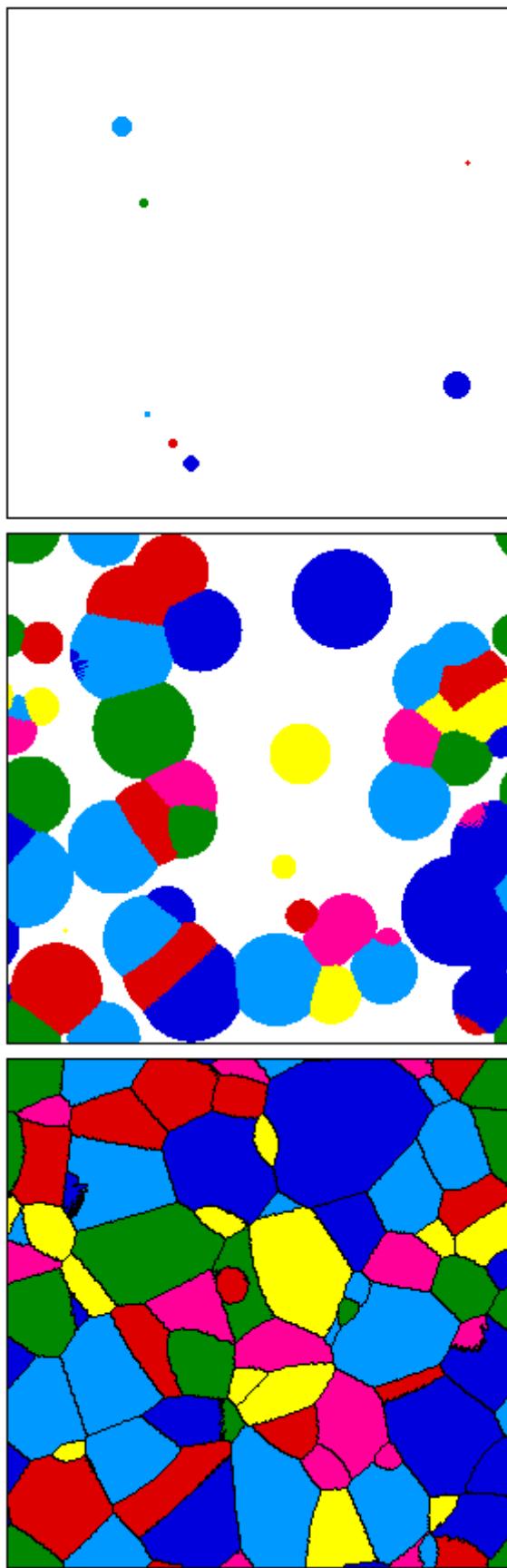
Caterpillar



Metal Stretch

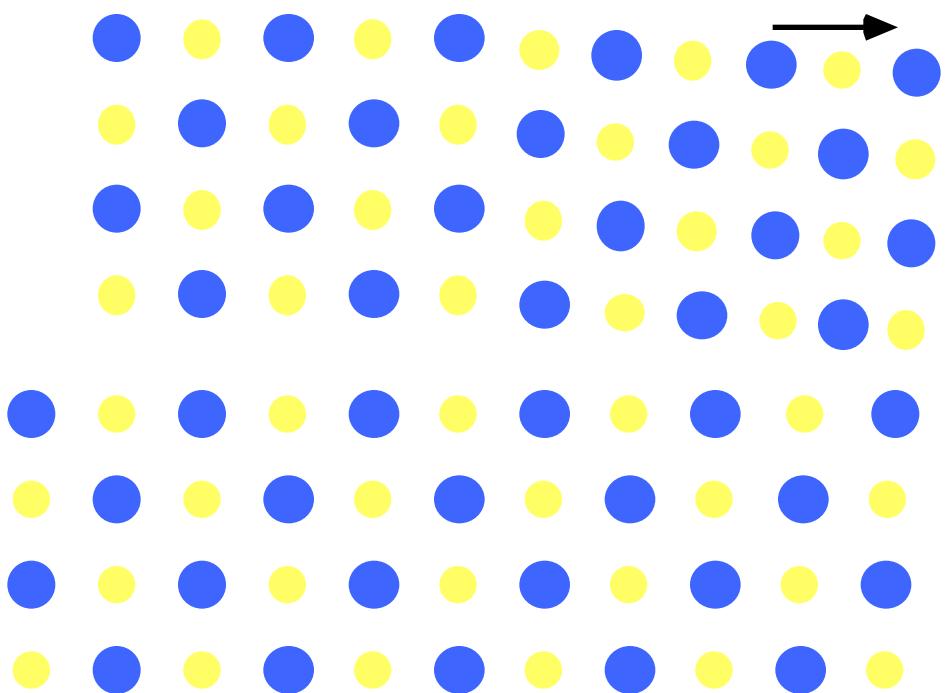
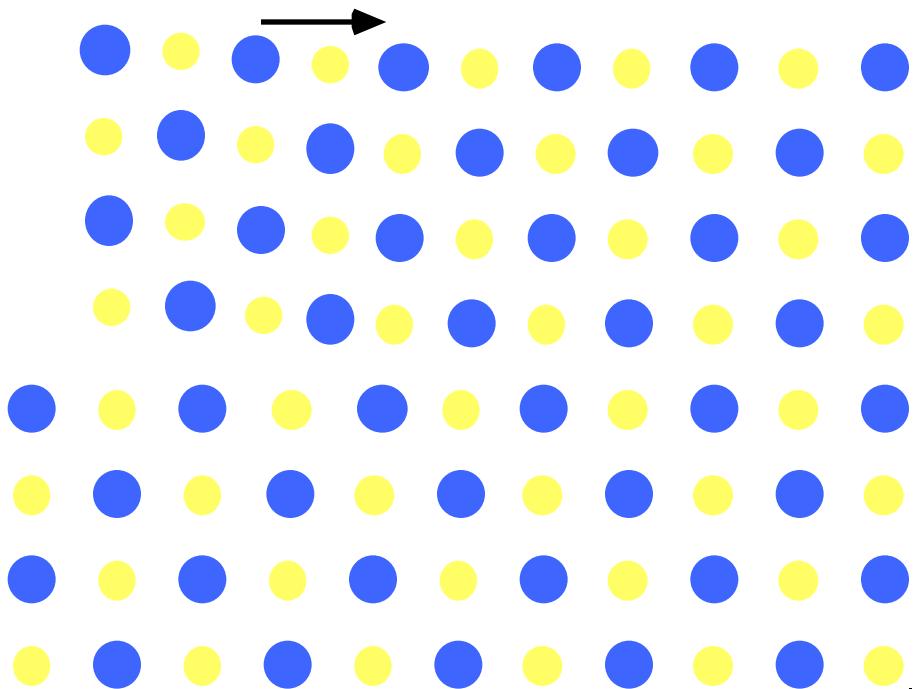


Nucleation and Growth



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Ionic Crystal



Production of F-centers

