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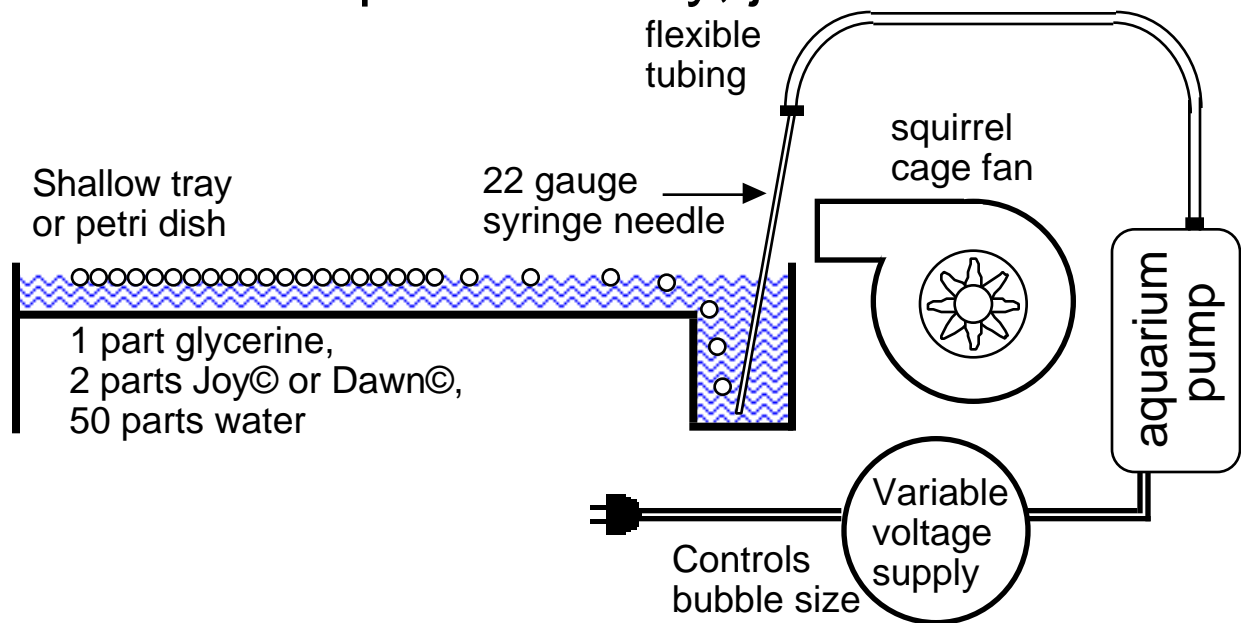
Laboratory Safety

DISCLAIMER

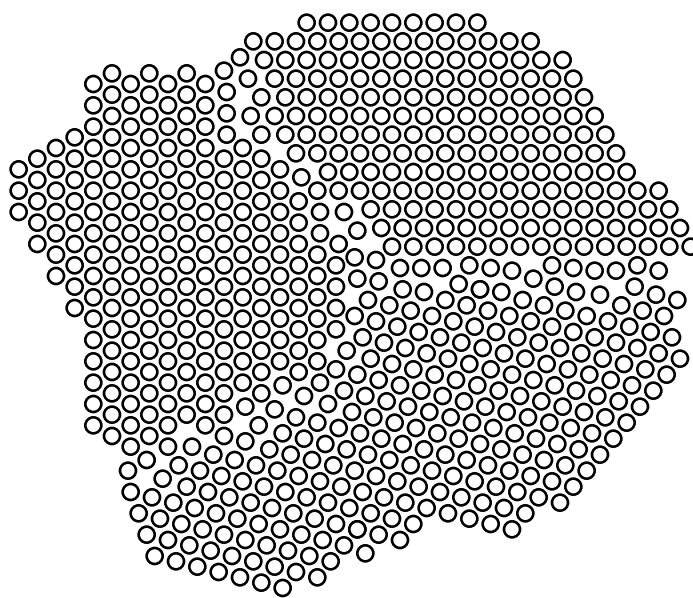
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Bubble Raft

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



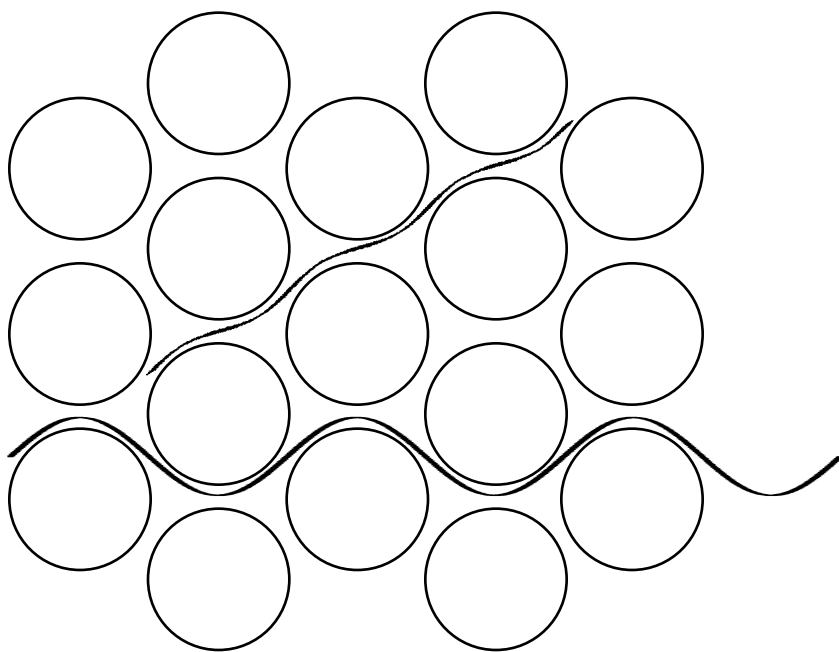
Grains in a polycrystalline material:



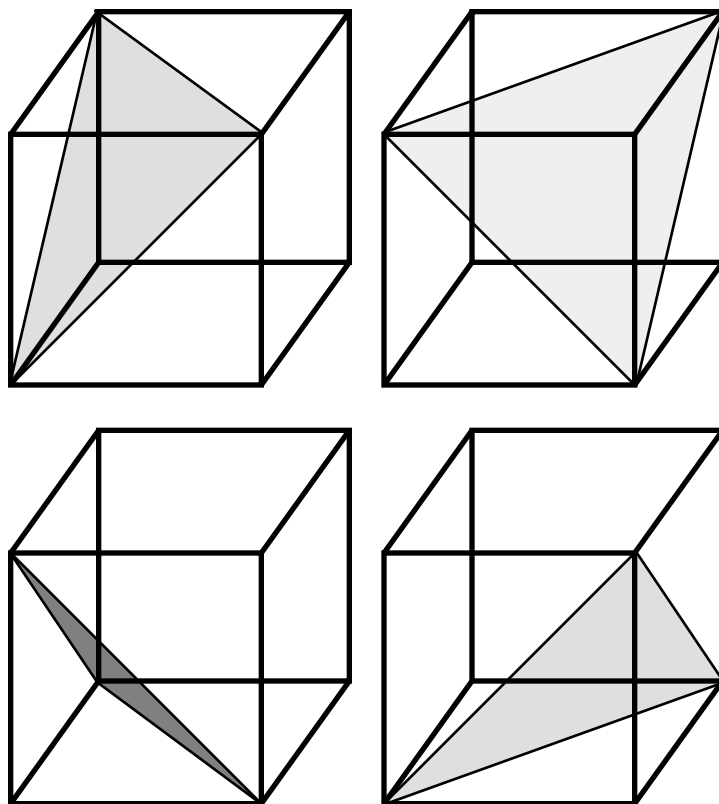
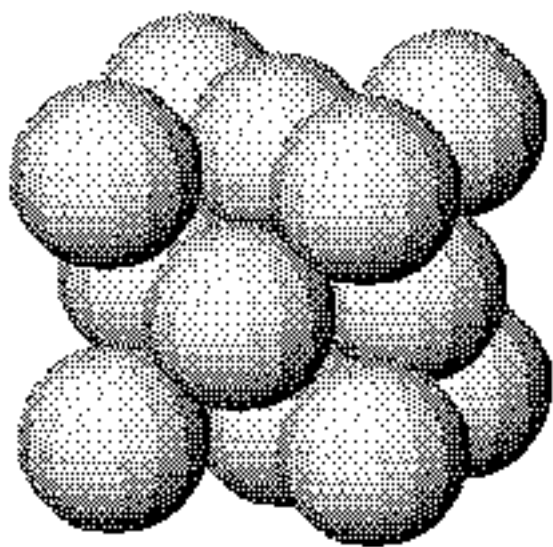
Every grain boundary is an array of dislocations.

Slip Planes

Movement
along
close-packed
slip planes
requires less
energy.

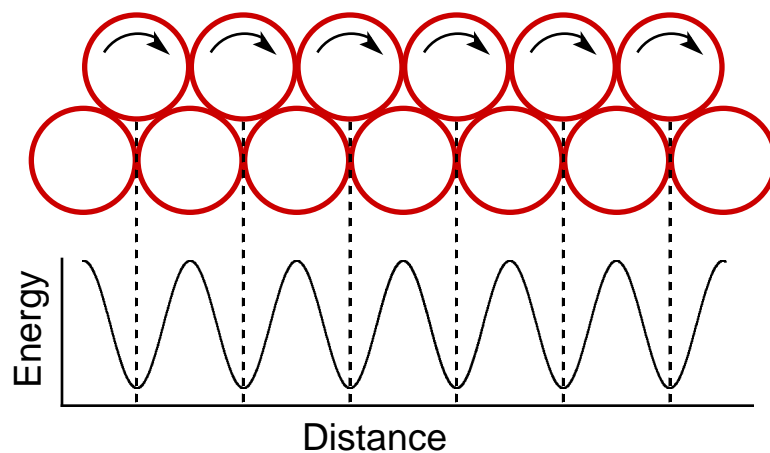


Face-centered cubic
metals have four sets
of close-packed slip planes.

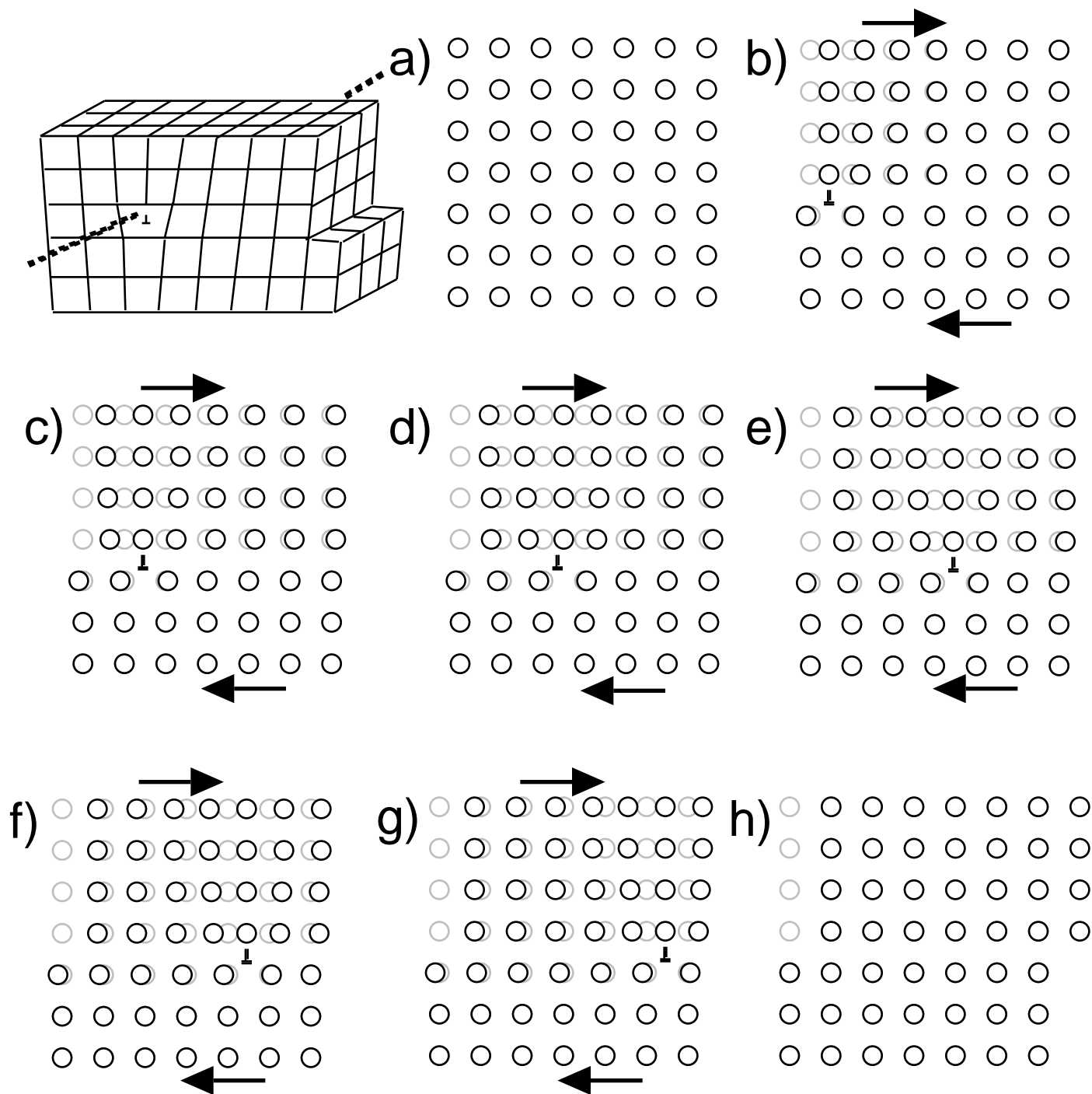


Slip Energy

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



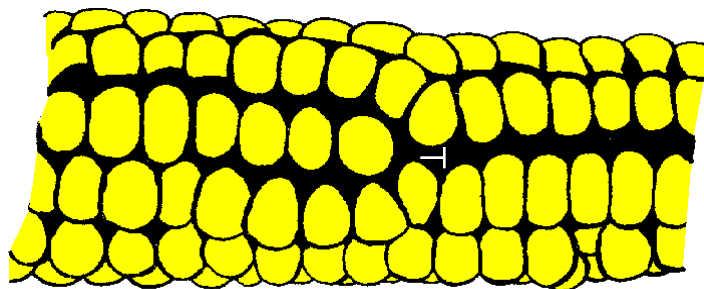
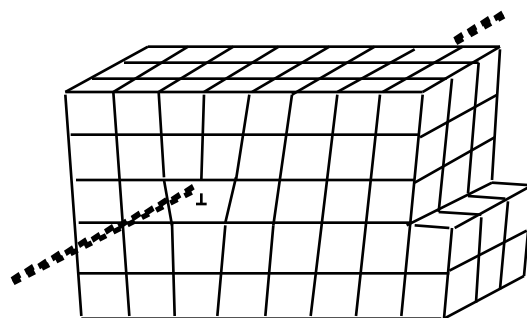
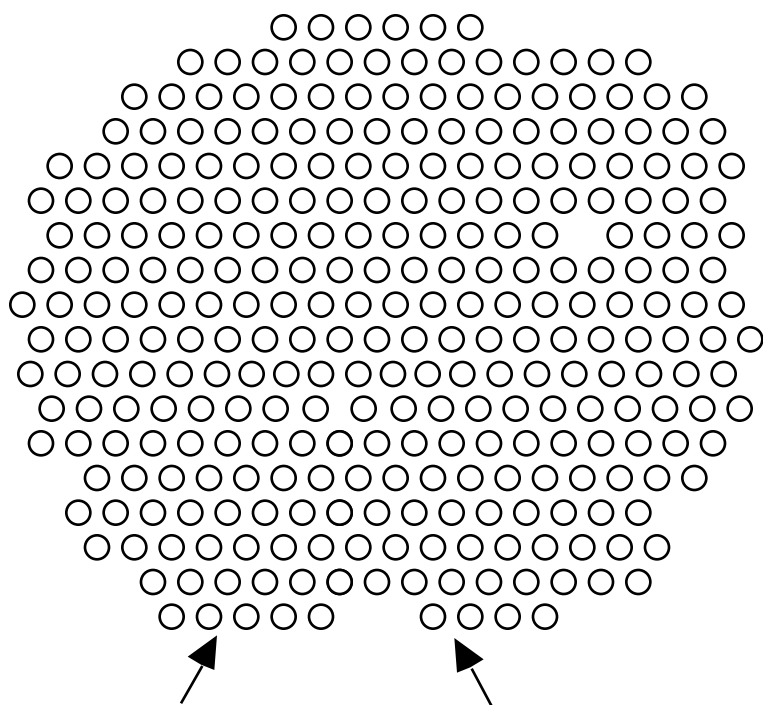
Dislocation Movement



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

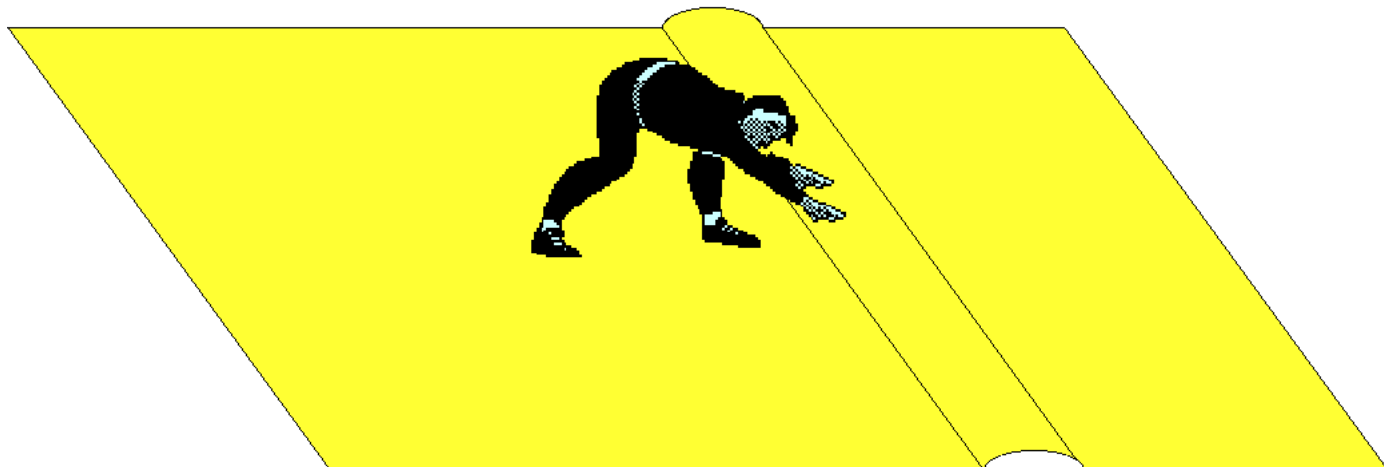
Dislocations

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

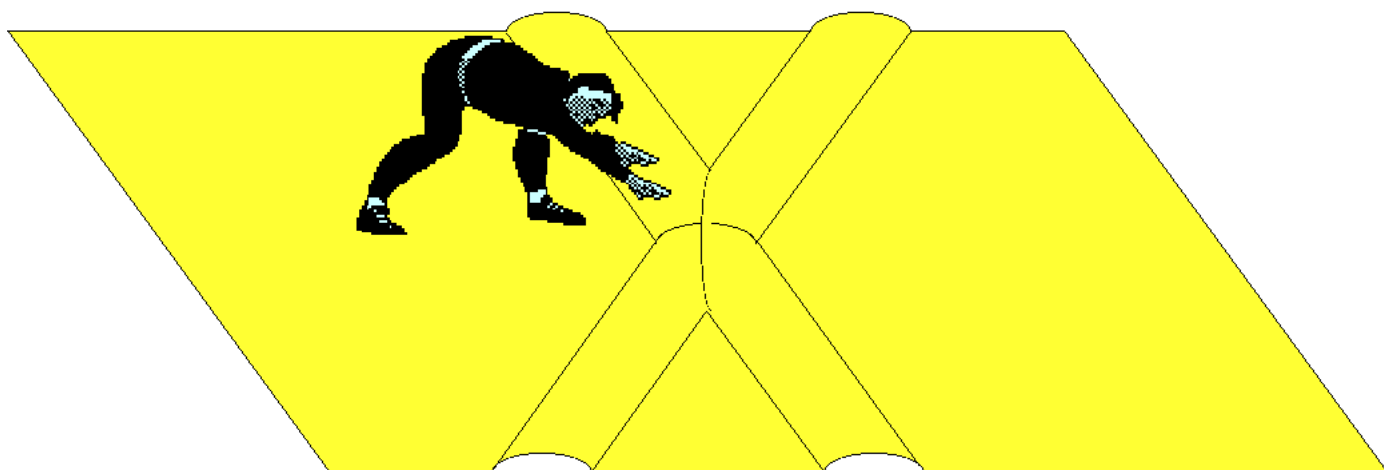


Dislocations and Work Hardening

Dislocation

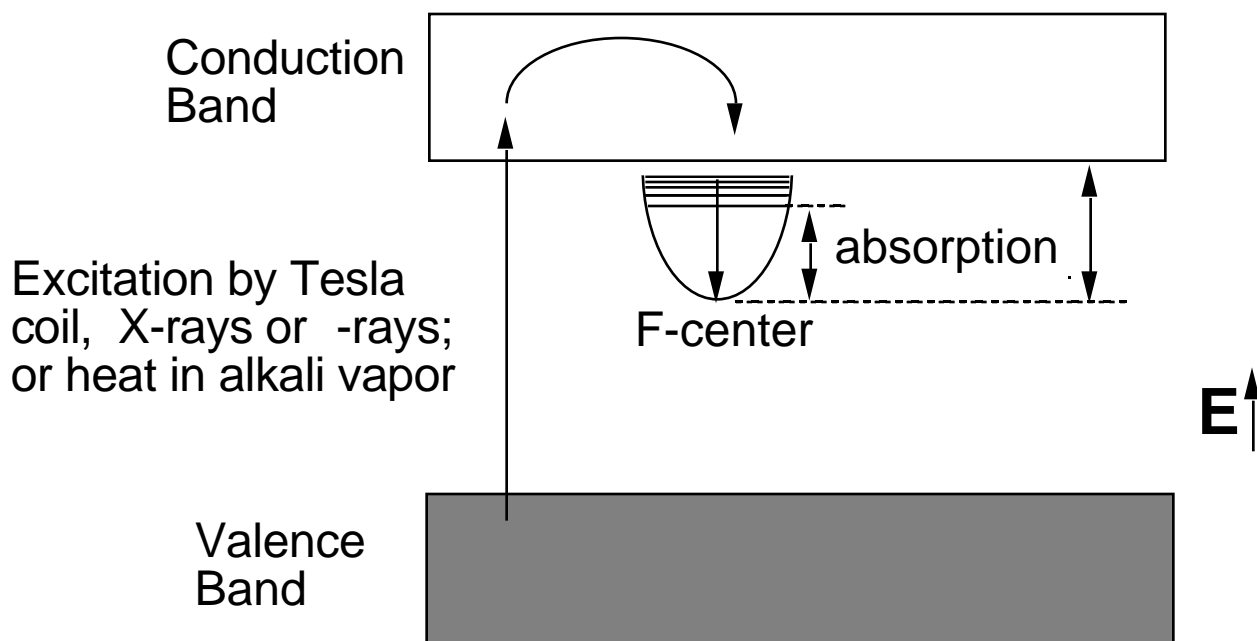
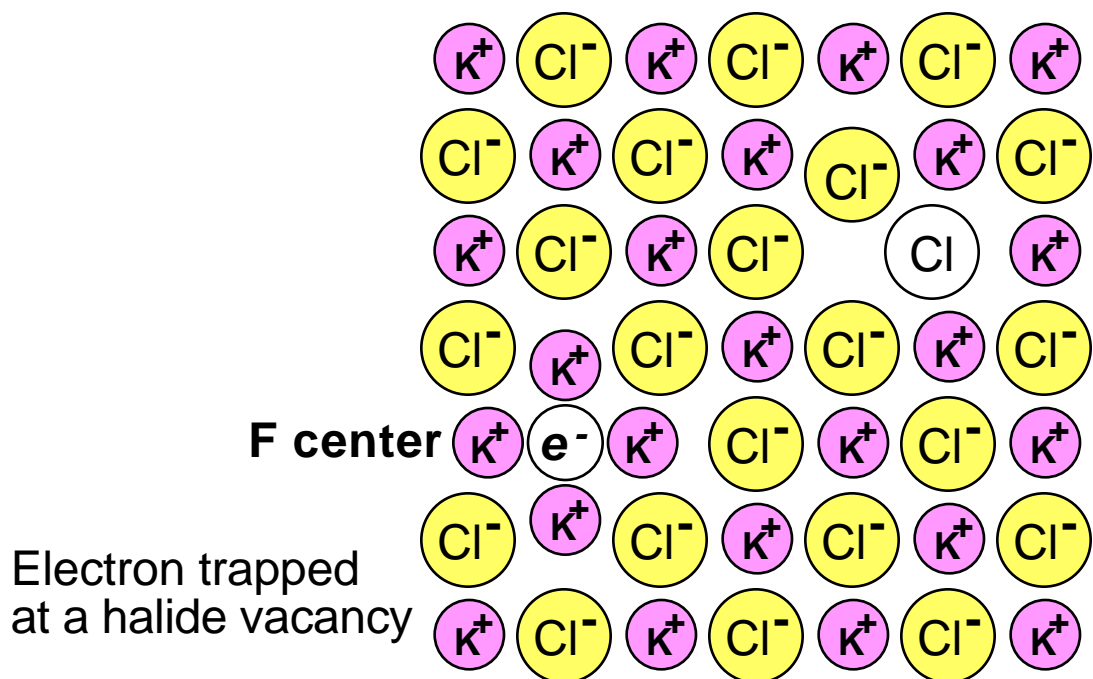


Work Hardening

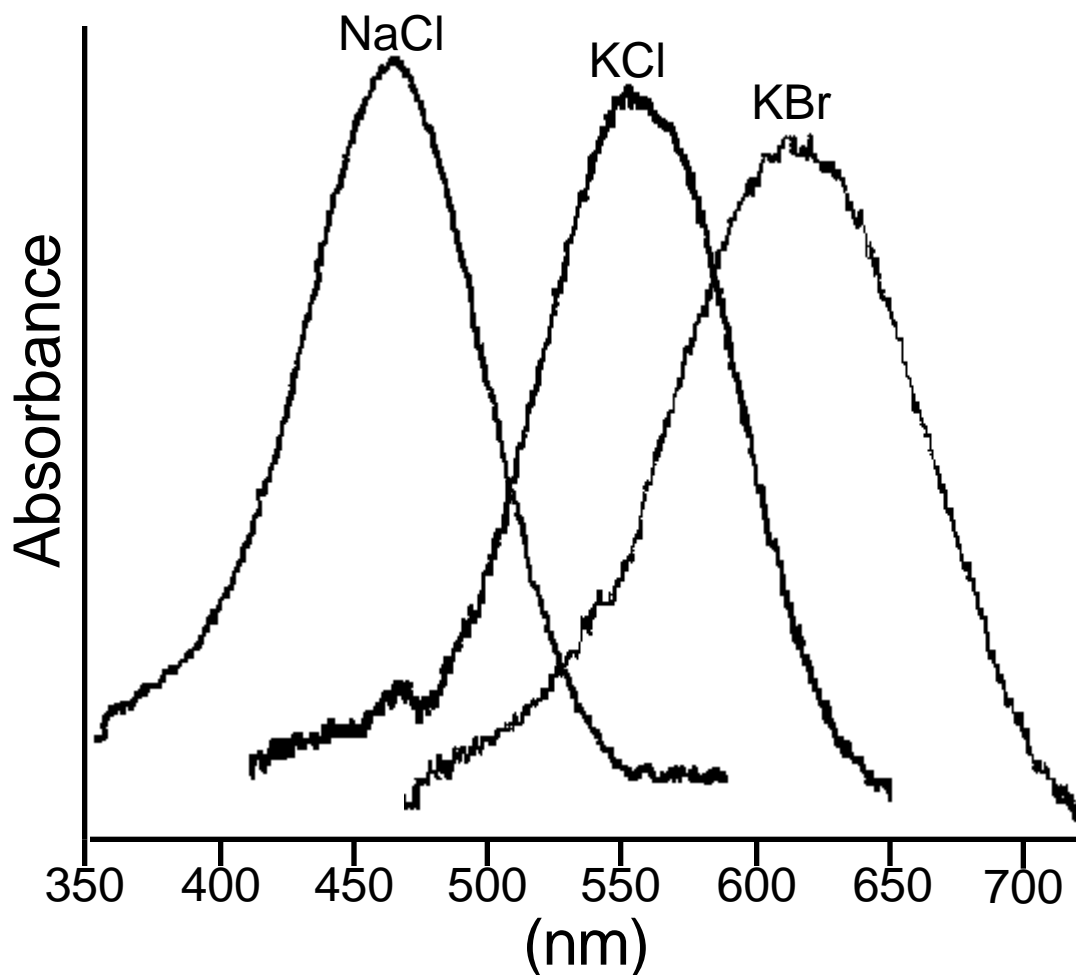
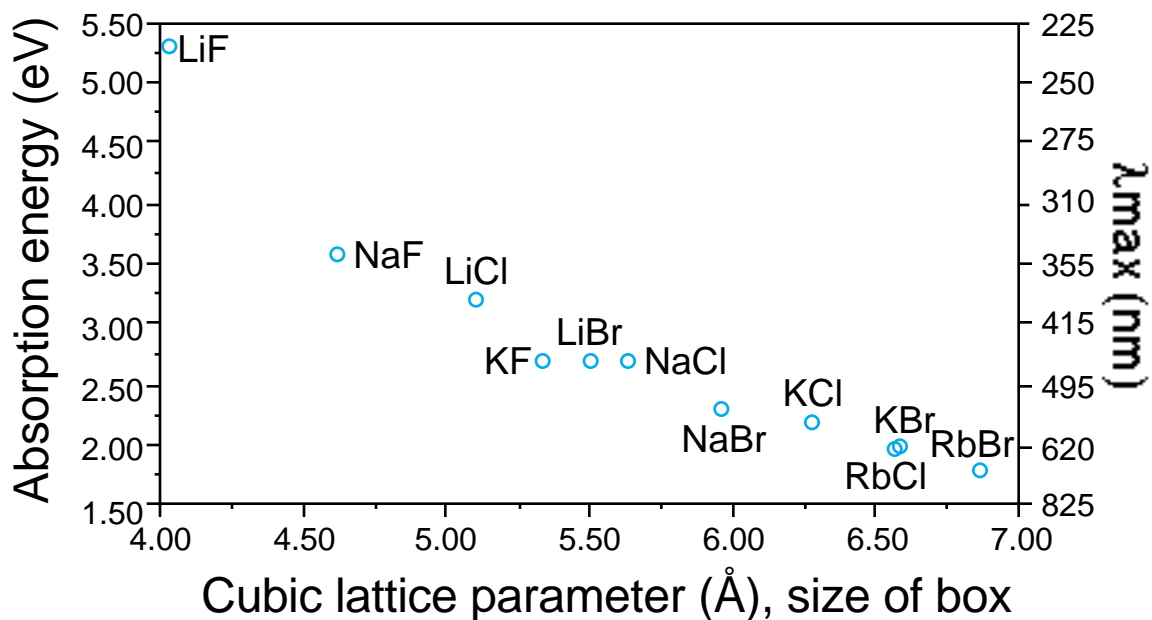


Color Centers

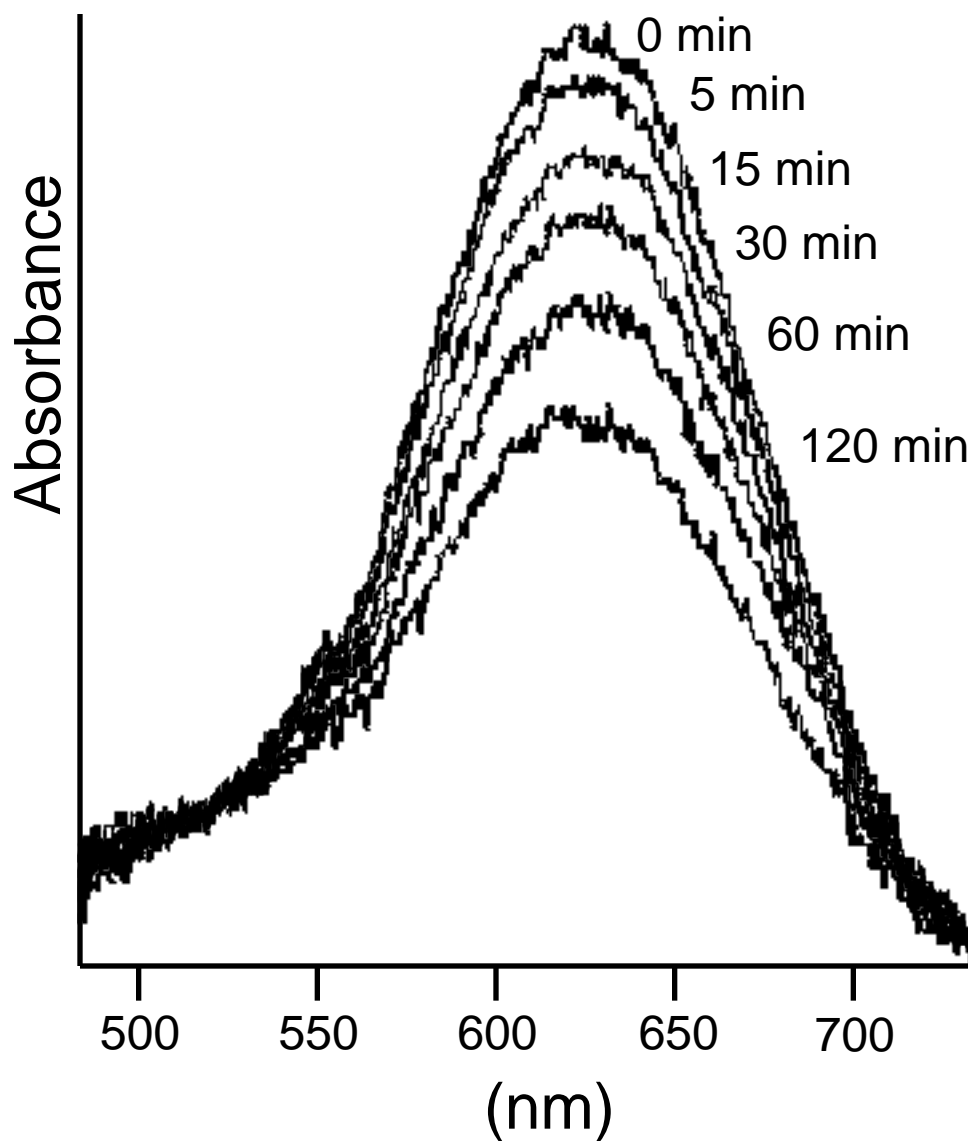
(F centers: from the German word Farbe for color)



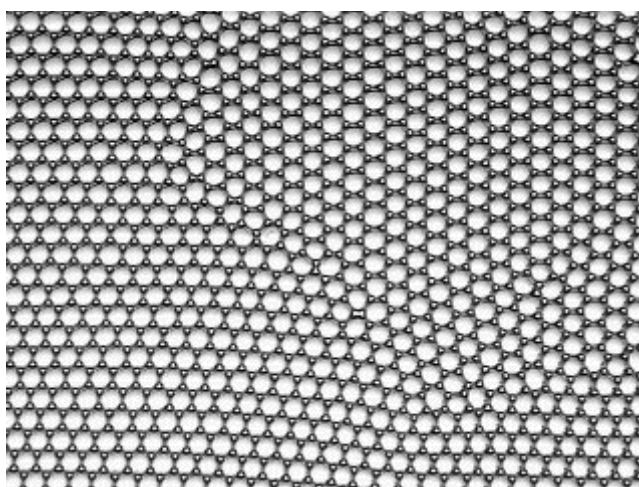
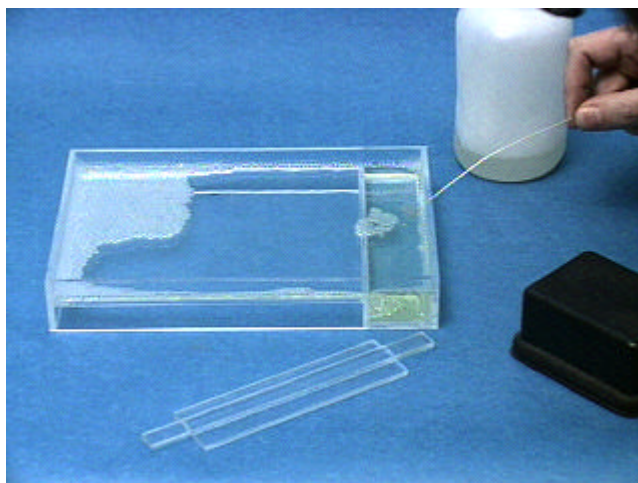
Particle in a Cubic Box



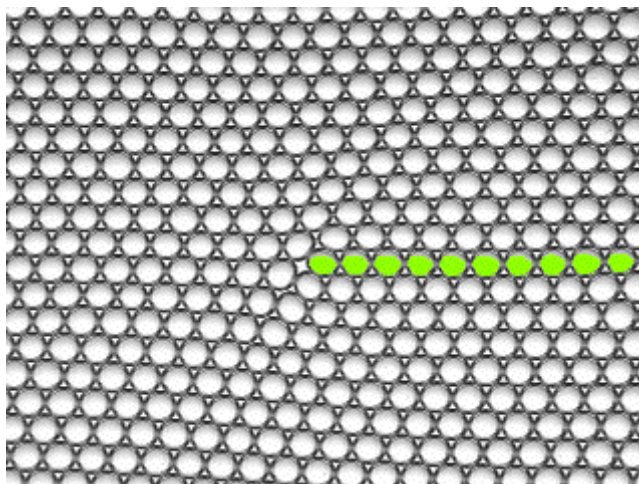
Decay of KBr F-center



Bubble Raft



Grain Boundary

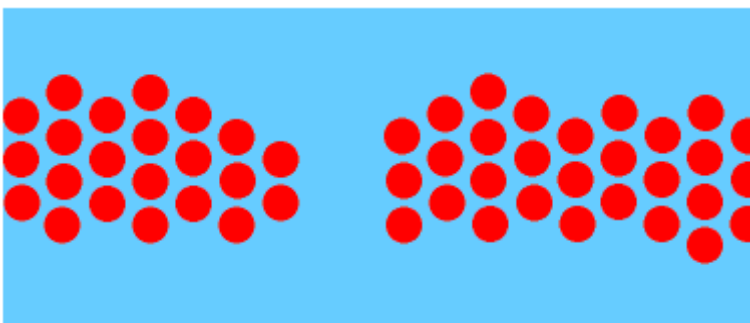
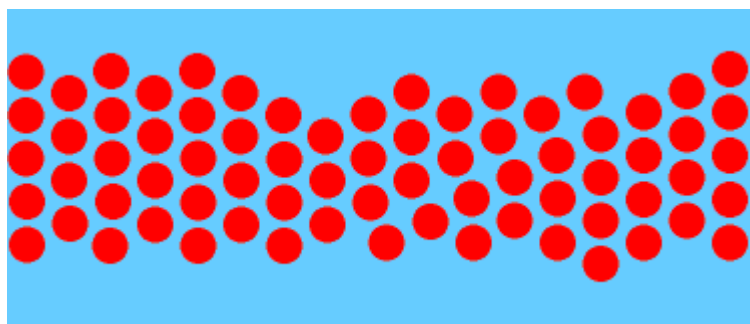
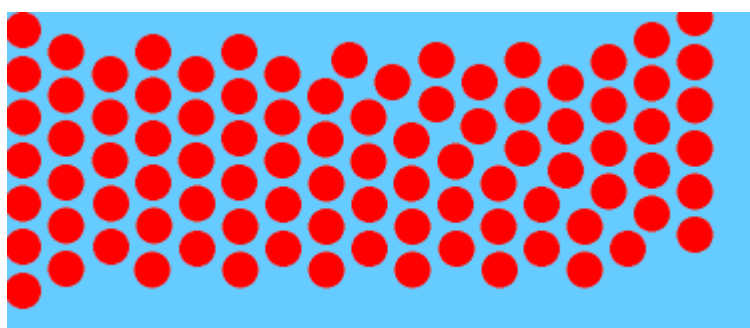
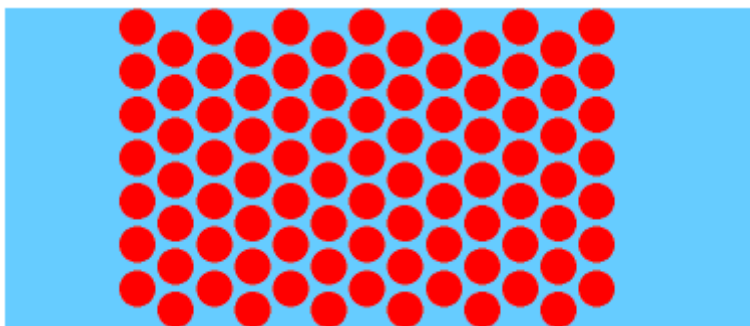


Dislocation

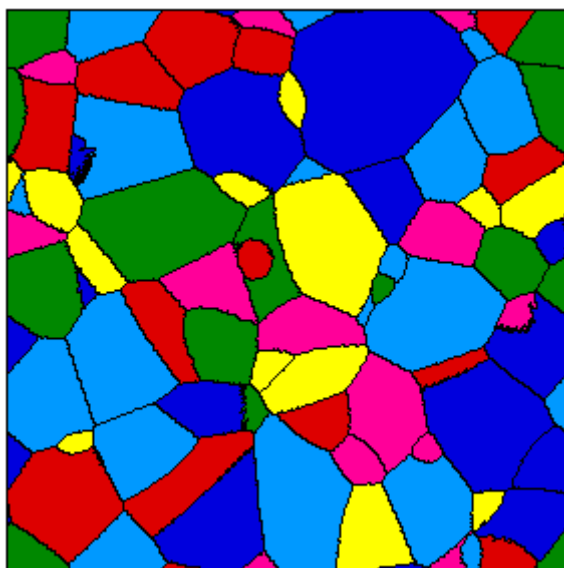
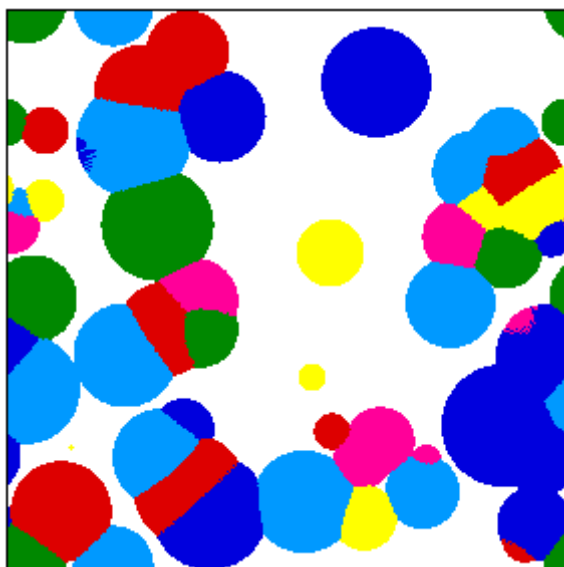
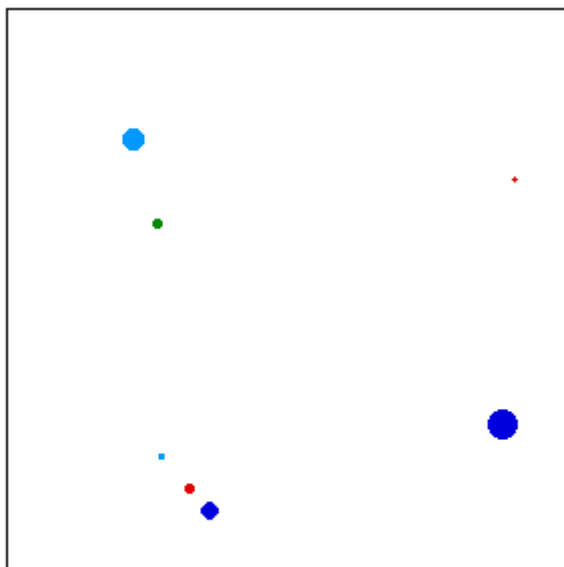
Caterpillar



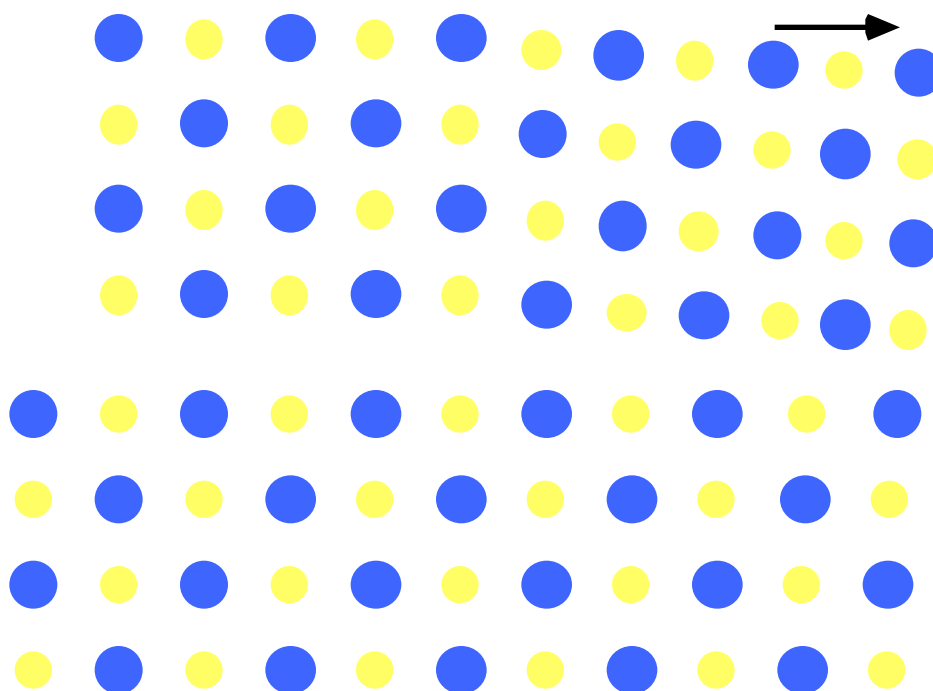
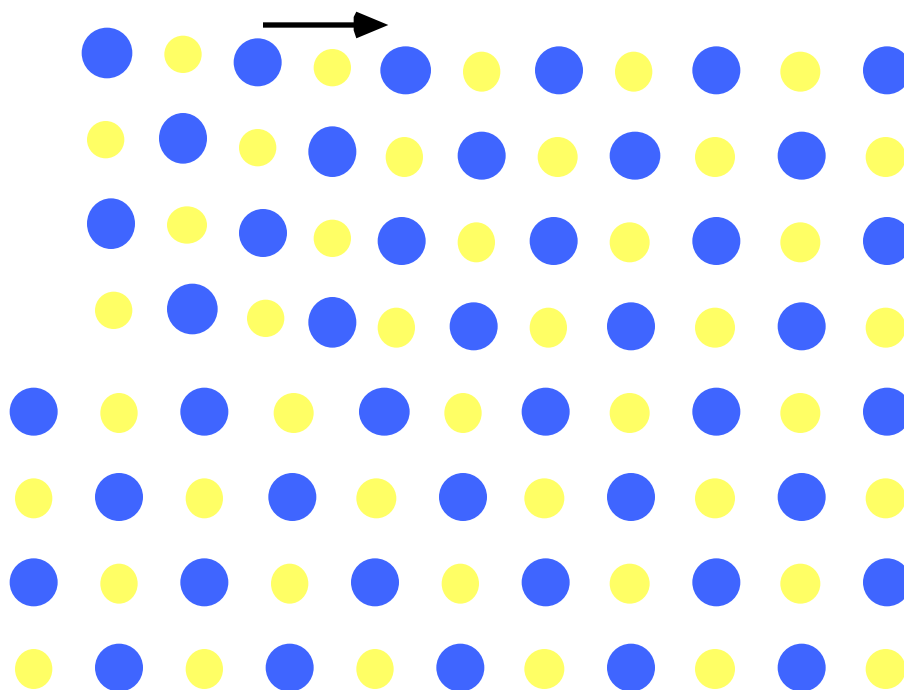
Metal Stretch



Nucleation and Growth



Ionic Crystal



Production of F-centers

