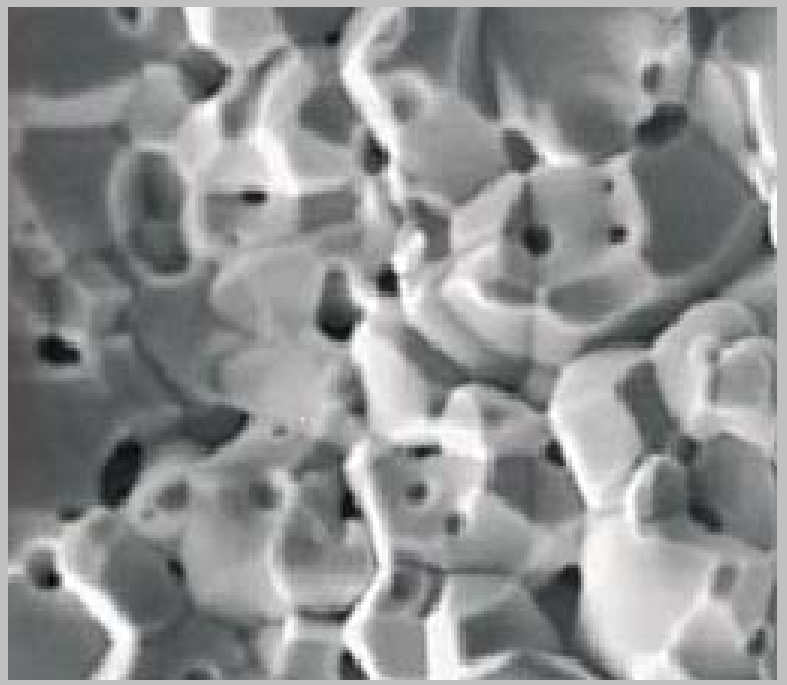
Rounding of the BH characteristic

- Ideal magnetic materials would have a **Square-Loop** characteristic, with very high permeability until driven into saturation – called a "**sharp saturation**" characteristic.

- A rounded, or "**soft saturation**" characteristic exhibits a gradual reduction of incremental permeability until finally the core becomes completely saturated.

- **Iron Powder Cores**, non magnetic gaps exist between the discrete magnetic particles.

- **Ferrite Cores,** similar non-magnetic inclusions occur among the sintered particles.

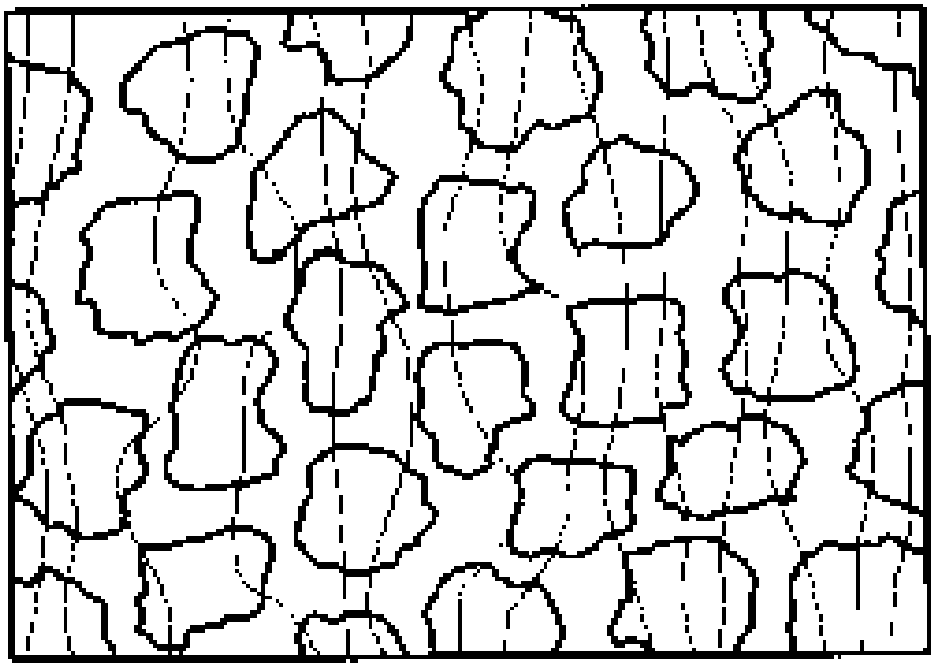


Non-magnetic inclusions shown between the sintered Ferrite particles

At low flux densities, flux tends to concentrate around the “easiest” paths (lowest reluctance) where the magnetic particles are in close proximity.

As the flux density increases, the easier path’s are the first to saturate. Those portions of the magnetic particles that have saturated become non-magnetic, making there paths more difficult. Incremental flux increase shifts to adjacent paths, where the magnetic material has not yet saturated, but where the gap is somewhat wider.

This process continues – effectively widening the distributed gap with increasing flux density and as a result, the permeability (and inductance) is progressively reduced – the end result is observed as rounding of the B-H curve



Easiest flux paths between Magnetic particles

At low flux densities, flux tends to concentrate around the “easiest” paths (lowest reluctance) where the magnetic particles are in close proximity.