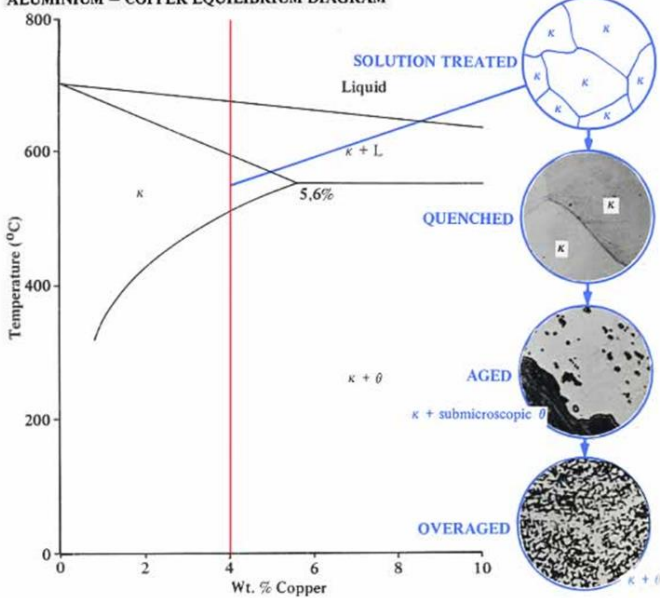
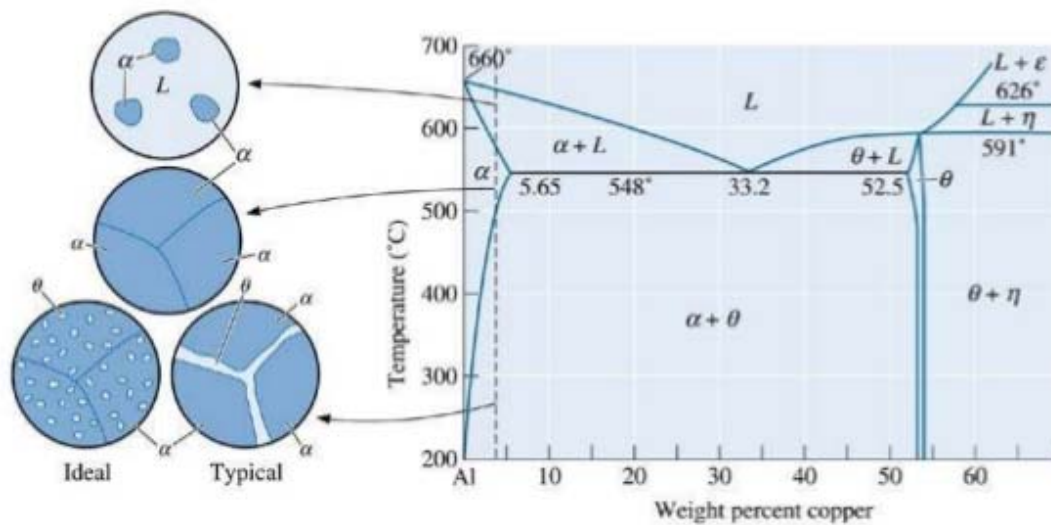


ALUMINIUM - COPPER EQUILIBRIUM DIAGRAM





**The aluminum-copper phase diagram and the microstructures that may develop during cooling of an Al-4% Cu alloy.**

NOTE: The “typical” microstructure where theta ( $\theta$ ) has formed at the grain boundaries is the result of slow quenching from solution heat treat temperature ( $\sim 540^\circ\text{C}$ ). This will result in a low strength alloy – not a good thing. The “ideal” microstructure results from quickly quenching from solution heat treat temperature preventing theta ( $\theta$ ) from forming. Then at lower temperatures (room temperature to  $\sim 250^\circ\text{C}$ ) the theta ( $\theta$ ) will precipitate out within the grains resulting in a strong alloy.

**Over-aging:** when held at elevated temperature for extended time, the precipitate can grow and “fit in” will resulting in very little lattice strain. This results in a decrease in strength.

## Coherent Precipitates Increase Hardness

