Fracture Summary

Type	Appearance	Microstructure
Ductile	• Obvious macroscopic plastic deformation • Shear lips - 45 degrees from principal tensile stress • non-reflective surfaces	• Microvoid formation and coalescence. • Shear deformation failure
Brittle	• Chevron "V" pattern-ridges or radiating lines • no plastic deformation, pieces fit back together • reflective fracture surfaces • fracture perpendicular to tensile stress	• flat cleavage planes; intragranular failure OR • intergranular failure; rock candy appearance
Fatigue	• "Beach" marks or clamshell marks indicate crack growth • Polished surface faces along with ductile or brittle fracture	• fatigue striations, possibly