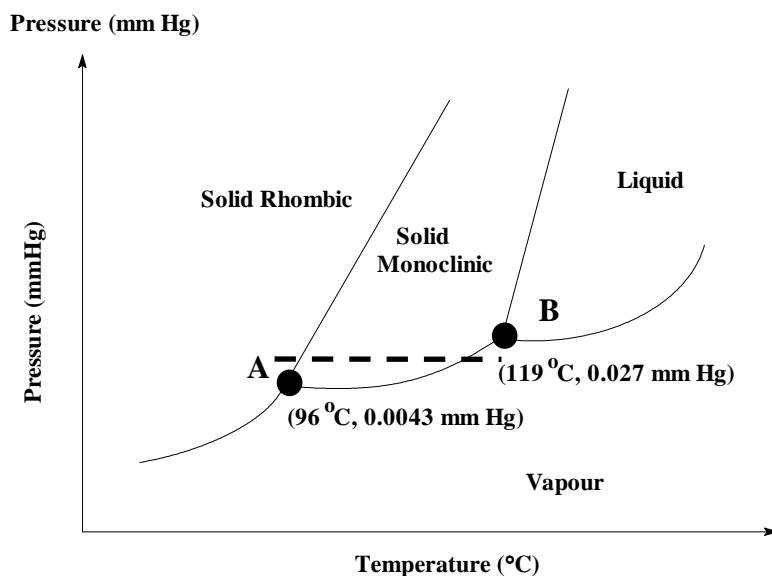


- Solid sulfur can exist in both rhombic and monoclinic forms. A portion of the phase diagram for sulfur is reproduced schematically below.

**Marks**  
**6**



How many triple points are there in the phase diagram?

**2 (marked as dots)**

What phases are in equilibrium at each of the triple points?

**(A) rhombic, monoclinic and vapour (at 96 °C and 0.0043 mmHg)**

**(B) monoclinic, liquid and vapour (at 119 °C and 0.027 mmHg)**

What phase is stable at room temperature and 760 mmHg pressure?

**solid rhombic**

Can monoclinic sulfur exist in equilibrium with sulfur vapour at 1.0 atm pressure?

**no**

Which solid form of sulfur is more dense? Explain your reasoning.

**Rhombic** The equilibrium line between rhombic and monoclinic slopes to the right. Beginning in the monoclinic region close to this line and increasing the pressure, the line is crossed vertically into the rhombic region. As rhombic is more stable at higher pressure, it must be more dense than monoclinic.

Describe the phase changes that occur when sulfur at 0.01 mmHg is slowly warmed from 90 °C to 130 °C.

**rhombic → monoclinic → vapour (see dotted line on phase diagram).**