A gas occupies a certain volume at 27 degree Celsius. If it is heated at constant pressure, its volume is exactly doubled at a temperature of

Solution

Let's use the ideal gas law:

$$P * V = v * R * T.$$

Where P is pressure of the gas, V is volume of the gas , T is temperature of the gas (in Kelvin), v is amount of substance of gas, R is the ideal gas constant.

Let assume $T_0 = 27° C = (273 + 27)K = 300 K$. As pressure P is constant, then

$$2 * P * V = v * R * T_1 \rightarrow T_1 = \frac{2*P*V}{v*R} = \frac{2*(P*V)}{v*R} = \frac{2*v*R*T_0}{v*R} = 2 * T_0.$$

So, the volume doubles when the temperature doubles. Here doubled temperature is

$$T_1 = 2 * 300K = 600K = (600 - 273)° C = 327° C.$$

Answer: $327° C$.