Answer on Question #43599 - Chemistry - Organic Chemistry

Question:

If 0.250 mol of red phosphorus reacts with 0.375 mol of yellow sulfur, what is the empirical formula of the product?

Answer:

Generally, when phosphorus reacts with sulfur mixture of phosphorus sulfides (P_xS_y) is formed. The molar ratio

$$\frac{n_P}{n_S} = \frac{0.250}{0.375} = \frac{2}{3}$$

So, the empirical formula of the product is **P_2S_3.**

By the way, phosphorus sulfide always includes 4 P atoms. So the actual formula of the product is **P_4S_6.**