Answer on the question #61919, Chemistry / General Chemistry

Question:

A certain reaction A + B --> products has the following rate law: rate of consumption of A = k[A]3. If the rate of consumption of A is 1.0 M/s what will be the rate when the concentration of A is doubled and that of B is also doubled?

Solution:

When the rate of consumption of A is 1.0 M/s, the rate constant of the reaction is:

$$k = 1.0/[A_1]^3$$

Then, when the concentration of A is doubled, the rate of consumption of A is:

$$v_A = \frac{1.0}{[A_1]^3} \cdot [2A_1]^3 = 1.0 \cdot 2^3 = 8.0\ M/s$$

According to the expression of the rate of consumption of A, the concentration of B doesn't have the effect on this rate.

Answer: 8.0 M/s