Answer on Question #43304, Chemistry, Other

Question:

The rate constant for a second order reaction (second order in A) is k = 0.132 L/mol/s. What is the rate of the reaction when the concentration of A is 0.158 mol/L?

Solution:

Generally, for a reaction of the form
aA + bB + ... → products
the rate law will be
$r=k[A]^a[B]^b...$
In this expression, the k is the reaction rate coefficient or rate constant, the exponents a and b are the reaction orders and depend on the reaction mechanism, [A] and [B] is molar concentrations of species A and B.
If rate of reaction depends on only one reactant concentration, rate law equation simplifies to
$r=k[A]^a$.
We can use this equation:
r = 0.132 L/mol·s × (0.158 mol/L)^2 = 0.00330 mol/L·s = 3.30×10^{-3} mol/L·s
Answer:
The rate of the reaction is 3.3×10^{-3} mol/L·s