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| --- | --- | --- |
| **Zero Order** | **1st order** | **2nd order** |
| Rate = k | Rate = k[A] | Rate = k[A]2 |
| [A]t= -kt + [A]o | ln [A] t = -kt + ln[A]o | 1 = kt + 1  [A]t [A]o |
| [A]t - [A]o = -kt | ln [A]t - ln[A]o = -kt | 1 - 1 = kt  [A]t  [A]o |
| [A] vs. t gives a plot with a straight line | ln [A] vs. t gives a plot with a straight line | 1/[A] vs. t gives a plot with a straight line |
| Straight line graph has slope = -k | Straight line graph has slope = -k | Straight line graph has slope = +k |
| t1/2 = [A]/2k | t1/2 = 0.693/k | t1/2 = 1/k[A] |
| rate does not depend on [A] | rate decreases over time since the amount of [A] decreases over time | rate decreases over time since the amount of [A] decreases over time |
| rate is constant over time | half-life is constant over time since [A] is not part of the half life equation | half-life is NOT constant over time since [A] is part of the half life equation |
| a particle with this order might be in the fast step of the mechanism | Likely occurs when a single molecule splits rather than collides with another molecule in the slow step of the mechanism | A bimolecular collision in the slow step of the mechanism may cause this |
| since [A] is part of the half-life equation, half-life is NOT constant over time | Radioactive decay is this type |  |
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