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composite mechanism

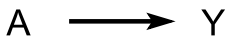
Also contains definition of: negative feedback

A reaction that involves more than one elementary reaction is said to occur by a composite mechanism. The terms complex mechanism, indirect mechanism, and stepwise mechanism are also commonly used. There are two main kinds of evidence for a composite mechanism:

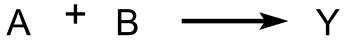
1. The kinetic equation for the reaction does not correspond to its stoichiometry.
2. There is experimental evidence, direct or indirect, for intermediates of such a nature that it is necessary to conclude that more than one elementary reaction is involved.

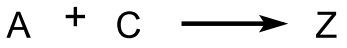
There are many types of composite mechanisms, for example:

1. Reactions occurring in parallel, such as:



   are called parallel reactions or simultaneous reactions. When there are simultaneous reactions there is sometimes competition, as in the scheme:

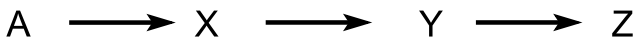




   where B and C compete with one another for A.
2. Reactions occurring in forward and reverse directions are called opposing reactions:

3. Reactions occurring in sequence, such as

   are known as consecutive reactions.
4. Reactions are said to exhibit feedback if a substance formed in one step affects the rate of a previous step. For example, in the scheme:



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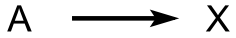
The intermediate Y may catalyse the reaction  (positive feedback) or it may inhibit it (negative feedback).

5. Chain reactions

Source:

PAC, 1996, *68*, 149 *(A glossary of terms used in chemical kinetics, including reaction dynamics (IUPAC Recommendations 1996))* on page 161

