An elementary bimolecular reaction originates from a collision between two reactants. Whether or not a collision results in a chemical reaction is determined by the energy of the reactants and their orientation. The total energy of the two reactants must be in excess of the activation energy, $E_a$, and the reactants must be in a favorable orientation for the chemical reaction to occur. While there are many different orientations possible for the collisions, usually not all of them will result in a chemical reaction. For most reactions, if the orientation is not correct, the reactants will bounce off of each other without a chemical reaction.

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