



**Report from the lecture presented by Ahmed Zewail**

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Energy is the primary driving force in the chemical and biological worlds and one of the key issues of chemistry is therefore to understand why and how chemical reactions occur, a theme discussed in Session II of this Nobel Symposium: “Chemical reactions, energy transfer and catalysis (part 1)”.

Chemical transformations involve changes in structure and composition, that is the breaking and formation of chemical bonds, therefore the structures of the reactants and products, and the intermediates and transition states formed during the reaction are important. The energy difference between reactants and products, described by chemical thermodynamics, provides necessary but not sufficient information for the understanding of chemical transformations; the more profound molecular understanding is provided by chemical dynamics, using both experimental studies and quantum chemical models.

Professor Ahmed H. Zewail, California Institute of Technology, described how time-resolve ultrafast electron diffraction, crystallography and microscopy could be used to “see” the chemical transformations in real time. The development of these new techniques pioneered by Zewail began with “small” molecular systems but are rapidly expanding into the biological sphere.