Friedel-Crafts Alkylation

Friedel-Crafts reaction in its many variations is the most important method for introducing alkyl groups into the aromatic ring. As the alkylating agents used are alkyl halides, alcohols, or particularly in industry, alkenes.

![Diagram of Friedel-Crafts Alkylation]

Catalysts for the reaction are Lewis acids as aluminum chloride, boron fluoride, or sometimes mineral acids as sulfuric or phosphoric acid. The mechanism of this reaction - bimolecular electrophilic substitution (S\textsubscript{E}2) (Groves, J. K., 1972).

The role of the catalyst is to increase the electrophilicity of alkylating agent due to his transfer to strongly polarized complex or an ion pair:

![Diagram of Electrophilic Substitution](image)

Highly polarized complex mineral acid reagent is reacted with an aromatic compound to form π-Complex, which becomes stronger σ- complex (W. E. Truce and C. W. Vriesen, 1953).

![Diagram of π-Complex Formation](image)

π-Complex formation occurs at a rapid preliminary stage, its role is small and the speed of the overall process is practically not affected (Smith, Michael B.; March, Jerry, 2007).
Further cleavage occurs proton action formed from the action bases, which can be a solvent molecule.

Formation and decay of \( \sigma \)-complex with elimination of a proton is the main direction of the reaction. In some cases, the \( \sigma \)-complexes one can but select, if disintegration is difficult, for example for steric reasons or because of the absence of a strong base (Groves, J. K., 1972).

The input of second t-buty group occurs in the same way:

References: