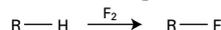


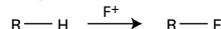
## Selective Fluorination

Tosoh F-Tech, Inc., a leading manufacturer of chemical building blocks and chemical Reagents presents its full line of "selective Fluorination" technology. These posters review specific examples of advanced materials that can be produced for pharmaceutical and electronic applications using Tosoh's full line of cutting edge technology options.

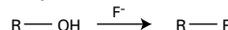
### Direct Fluorination (F<sub>2</sub> Gas)



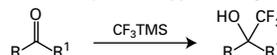
### Electrophilic Fluorination (F-Plus)



### Nucleophilic Fluorination (FAR)



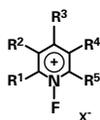
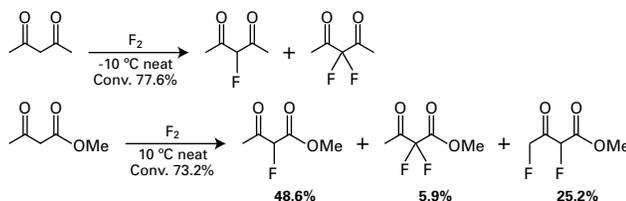
### Trifluoromethylation (Ruppert's Reagent etc.)



## Direct Fluorination

Tosoh F-Tech has made dramatic technological breakthroughs on direct fluorination of active methylene compounds with F<sub>2</sub> gas. As a result, mono-fluorinated organic compounds are now available in multi-ton quantities.

### Example



## Electrophilic Fluorination

### (F-Plus Fluorinating Reagents)

N-Fluoropyridinium salts are electrophilic fluorinating reagents, consisting of a pyridinium ring and its counter anions. Using these reagents, a fluorine atom can be easily introduced into aromatics, carbanion and active methylene compounds.



## Nucleophilic Fluorination

The Conversion of hydroxyl groups to a fluoro compound by F<sup>-</sup> is a valuable method to produce building block materials for Pharmaceutical and Agricultural Applications. The Reaction proceeds via an SN2 type mechanism, and inversion of configuration occurs at a stereogenic center to give a corresponding fluorinated compound.

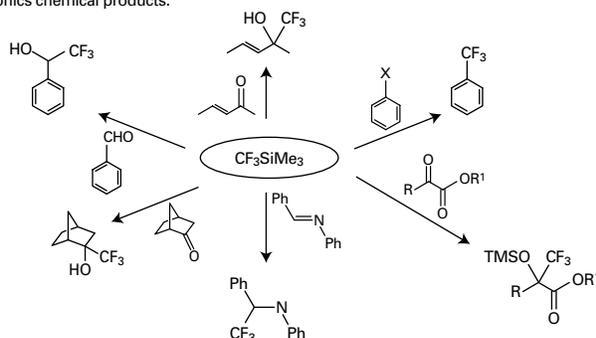
R-OH	R-F	Conv.	Select.
		99%	94%
		99%	80%
		95%	90%
		94%	85%

## Trifluoromethylation

### (Ruppert's Reagent)

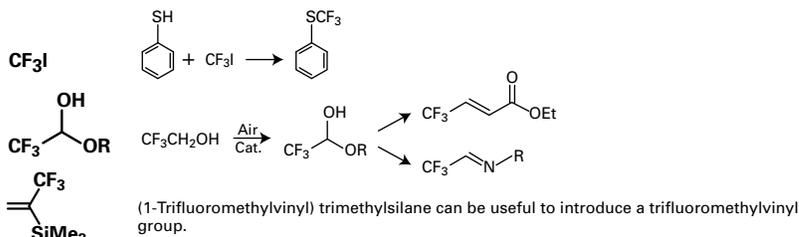
CF<sub>3</sub>SiMe<sub>3</sub>

Tosoh F-Tech has developed a process for the large-scale production of (Trifluoromethyl)trimethylsilane (CF<sub>3</sub>-TMS, Ruppert's Reagent) which provides a convenient method to introduce a CF<sub>3</sub> group to many pharmaceutical and electronics chemical products.



## New Fluorinated Building Blocks

Tosoh F-Tech continues to develop new fluorinated building blocks. The following are some examples.



(1-Trifluoromethylvinyl) trimethylsilane can be useful to introduce a trifluoromethylvinyl group.



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TOSOH

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