

## Regarding chemical stability of SF<sub>6</sub>

SF<sub>6</sub> has outstanding advanced thermal and chemical stability, and it could even be said that it has nearly the same level of inertness and stability as rare gases in the air.

Naturally its insolubility at room temperature with water, acid, and alkali cause absolutely no addition of water. Its thermal stability is outstanding and, without a catalyst, is stable even at 500°C.

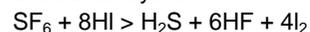
However, if coexisting with metallic materials, it may may cause fine decomposition at over 200°C depending on the type of material.

In other words, SF<sub>6</sub> does not cause decomposition when coexisting with aluminium and copper, but in the case of steel and silicon steel, decomposition, albeit a small amount, begins at over 200°C, and if moisture exists, decomposition is further promoted.

It does not occur with alkali aqueous solutions and molten alkali, but at over 200°C, there is a slight reaction with metallic sodium.

Also, at 180-250°C, decomposition occurs due to Al<sub>2</sub>Cl<sub>6</sub> or SO<sub>2</sub>, but it has been reported that it takes 25 hours for decomposition to be seen.

There is no reaction with H<sub>2</sub>, Cl<sub>2</sub>, I<sub>2</sub> even beyond 600°C, but with HI, at room temperature, the following reaction takes place quantitatively, and it has been recommended that this be used in analysis.



When exposed to high temperatures like an arc or corona, decomposition occurs under certain conditions and low grade sulfur fluoride such as SF<sub>4</sub> and hydrofluoric are created.

If moisture is present, this is further promoted, and due to hydrolysis, oxygenated sulfur fluoride compounds and hydrofluoric acid is created.

In this way, SF<sub>6</sub> may, depending on conditions, partially decompose, but overall it is extremely stable.

Metallic materials		SF <sub>6</sub> decomposition amount
Silicon steel sheet	150°C	At 270 days, 0.6%-0.8%
	223°C	At 270 days, 8-10%
Carbon steel	223°C	At 270 days, 2-4%
Copper	150°C	Much less than at 223°C
	223°C	At 90 days, 0.13% At 270 days, 0.17%
Aluminium	150°C	Almost 0% at 270 days
	223°C	At 270 days, less than 0.1%
Lead		Similar to copper

Metallic materials	Decomposition ratio (%/year)	
	200°C	250°C
Aluminium	-	0.006
Copper	0.18	1.4
Silicon steel sheet	0.005	0.01
Mild steel	0.2	2