

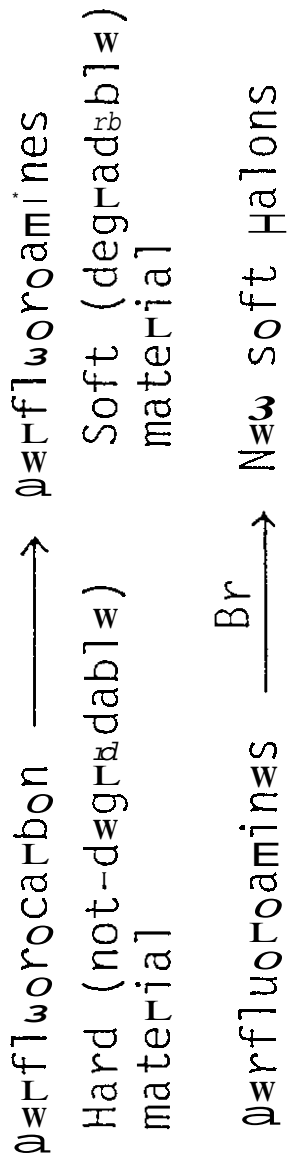
8 Study for the Development of New Halon Alternatives supported by Environmental Agency

Three years project (FY1990 ~ FY1992)

FY1990 (April 1, 1990 ~ March 31, 1991)

About 30,000\$

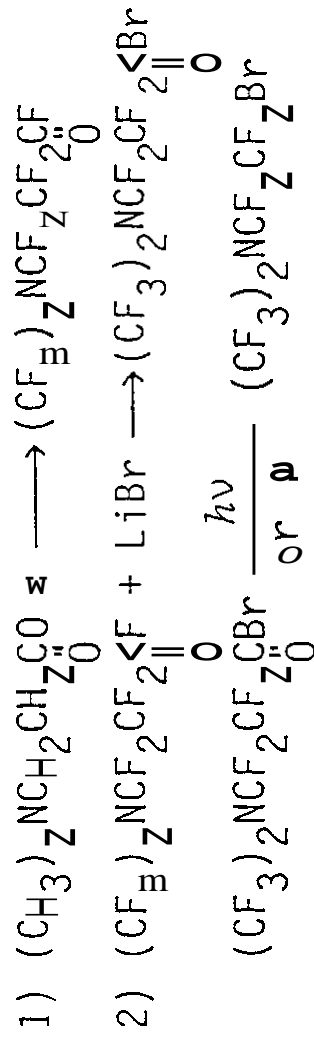
9 Outline of the work



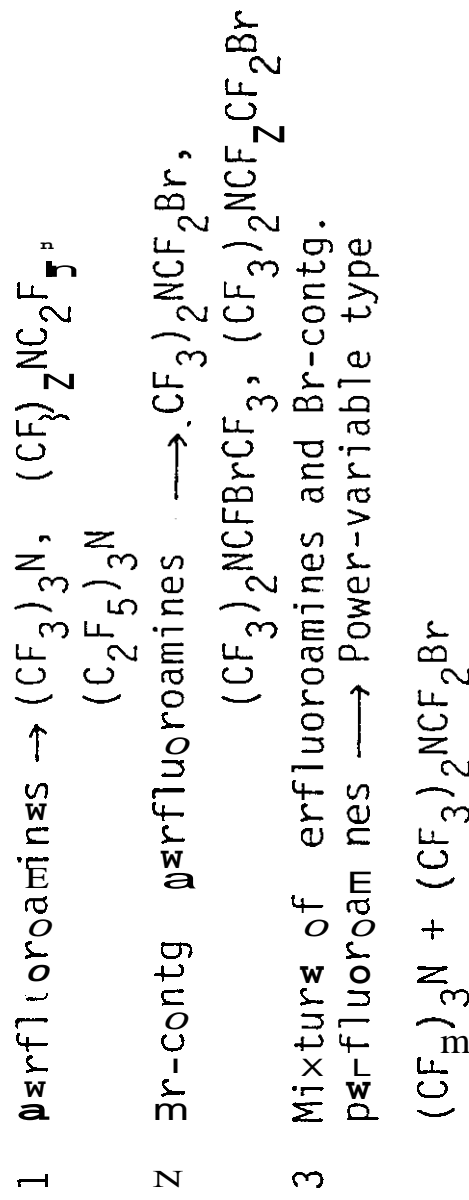
(Artificial Blood)

Presented by:  
Takashi Abe  
Government Industrial Res Inst.  
Nagoya, Chemistry  
Hirate-cho, Kita-Ku  
Nagoya  
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◦ Synthesis of new soft Halons (FY1990 ~  
 → Govern. Ind. Res. Inst., Nagoya



◦ Evaluation as a fire extinguisher (FY1991 ~  
 → Fire Institute of Japanese Government



◦ Evaluation for environmental impacts (FY1992 ~  
 → Environment Institute,  
 Environment and Resources Institute

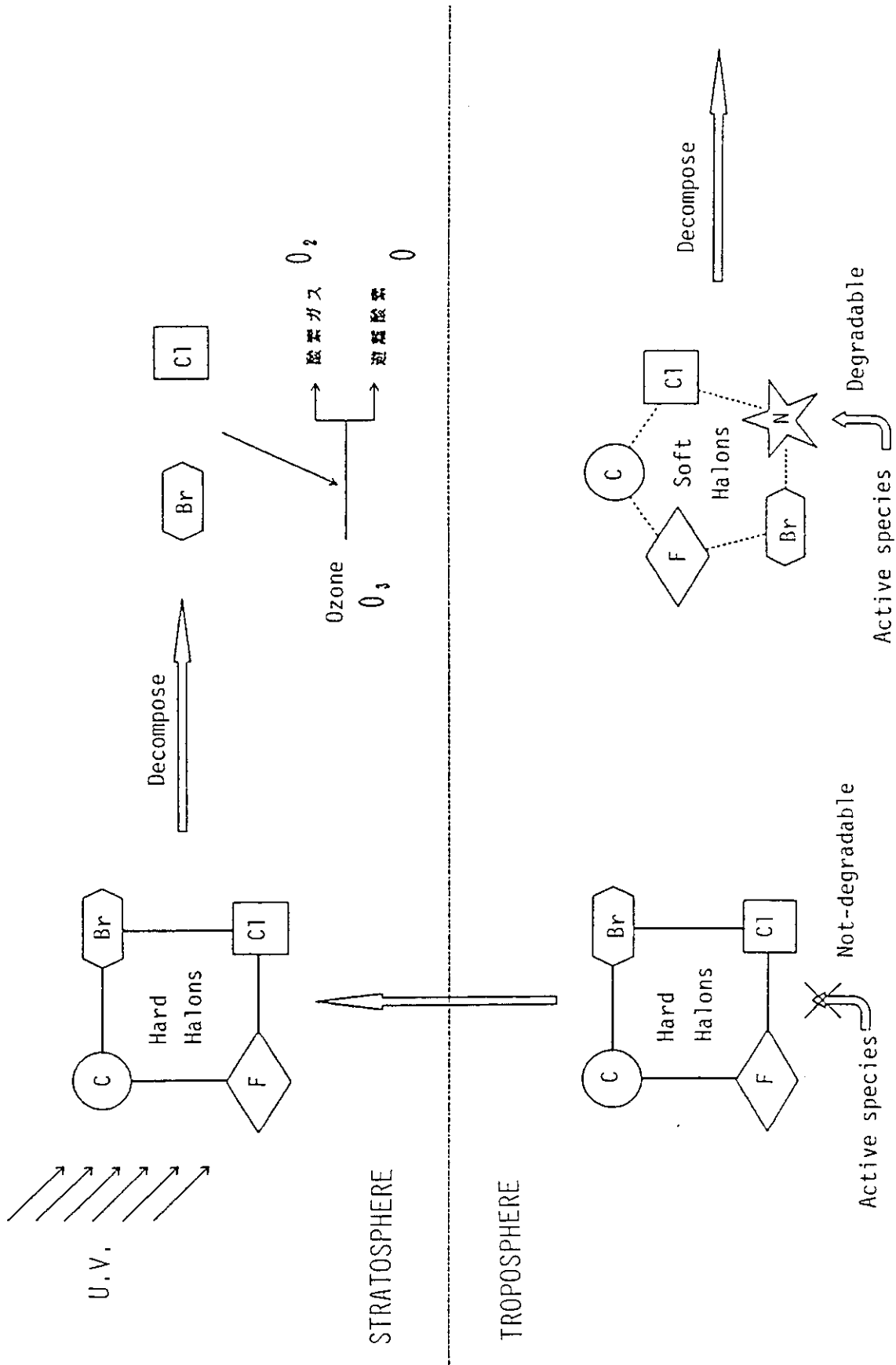
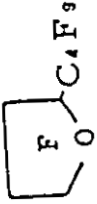


表 4. 六フッ素原子をもちつペルフルオロ化合物の性質

化学式	融点 (°C)	化学式	融点 (°C)
$CF_3SF_5$	-21	$n-C_4F_9SF_5$	70
$C_2F_5SF_5$	11	$CF_3SF_4CF_3$	21
$n-C_3F_7SF_5$	42	$C_2F_5SF_4C_2F_5$	68
$(CF_3)_3N$	-6	$(C_3F_7)_3N$	130
$(CF_3)_2NC_2F_5$	21	$(C_4F_9)_3N$	179
$(C_2F_5)_3N$	68	$(C_5F_{11})_3N$	213
$CF_3OCF_3$	-59		103
$C_2F_5OC_2F_5$	1		
$C_4F_9OCF_3$	36		

ペルフルオロアミン化合物

$\text{NF}_3$                       BP  $-129^\circ\text{C}$                        $\angle\text{FNF}$   $106.6^\circ$

用途    ドライエッチング剤

$(\text{C}_3\text{F}_7)_3\text{N}$     BP     $130^\circ\text{C}$     人工血液 (酸素輸液)

$(\text{C}_4\text{F}_9)_3\text{N}$     BP     $173^\circ\text{C}$     半導体試験液

$(\text{C}_5\text{F}_{11})_3\text{N}$     BP     $215^\circ\text{C}$     ペーパーフェーズソルダーリング液

$(\text{CH}_3)_3\text{N} \longrightarrow (\text{CF}_3)_3\text{N}$  (11 wt%),  $\text{CHF}_2\text{N}(\text{CF}_3)_2$  (2),  
 $(\text{CHF}_2)_2\text{NCF}_3$  (0.5),  $(\text{CHF}_2)_3\text{N}$  (0.1)

$\text{C}_2\text{H}_5\text{N}(\text{CH}_3)_2 \longrightarrow \text{C}_2\text{F}_5\text{N}(\text{CF}_3)_2$  (41 wt%),  $(\text{CF}_3)_3\text{N}$  (5),  
 $\text{C}_2\text{F}_5\text{N}(\text{CF}_3)\text{CHF}_2$  (1.5)

$(\text{C}_2\text{H}_5)_2\text{NCH}_2\text{CH}_2\text{Cl} \longrightarrow (\text{C}_2\text{F}_5)_2\text{NCF}_2\text{CF}_2\text{Cl}$  (12 mol%)

$\text{CH}_3\text{N}(\text{CH}_2\text{CH}_2\text{Cl})_2 \longrightarrow (\text{CF}_3)_2\text{NCF}_2\text{CF}_2\text{Cl}$  (4),  
 $(\text{CF}_3)(\text{C}_2\text{F}_5)\text{NCF}_2\text{CF}_2\text{Cl}$  (13),  
 $\text{CF}_3\text{N}(\text{CF}_2\text{CF}_2\text{Cl})_2$  (7)