SYNTHESIS OF PENTAFLUOROSELENIUMOXIDE FLUOROCARBONS

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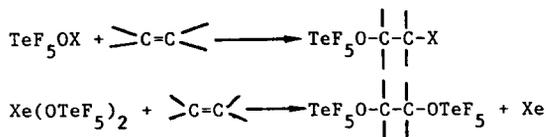Canoga Park, CA 91304 (U.S.A.)

SUMMARY

The reaction of xenon bis-pentafluoroseleniumoxide, $Xe(OSeF_5)_2$, with the haloolefins, $CF_2=CF_2$, $CF_3CF=CF_2$, $CF_2=CFCl$, and $CF_2=CFH$, results in the low to moderate yield addition of two SeF_5O- groups to the double bond. These are the first examples of this type of addition. From $c-C_5F_8$ and the above olefins these same reactions also gave as products, $C_2F_5OSeF_5$, $n-C_3F_7OSeF_5$, $c-C_5F_9OSeF_5$, and SeF_5OCF_2COCl in higher yields than the bis SeF_5O- compounds. Surprisingly, those olefins capable of forming thermally stable epoxides, i.e. C_3F_6 and $c-C_5F_8$, were found to produce significant yields of the corresponding epoxides as a by-product in these reactions, while the remaining olefins gave significant amounts of acid fluorides instead. Characterizing data are presented for all of these new R_fOSeF_5 compounds.

INTRODUCTION

Recently we reported on the high yield addition of TeF_5O- groups to fluoroolefins using $Xe(OTeF_5)_2$ and $TeF_5OX(X=F,Cl)$ [1-4].

$$TeF_5OX + \;\substack{>}C=C\substack{<} \longrightarrow TeF_5O-\overset{|}{\underset{|}{C}}-\overset{|}{\underset{|}{C}}-X$$

$$Xe(OTeF_5)_2 + \;\substack{>}C=C\substack{<} \longrightarrow TeF_5O-\overset{|}{\underset{|}{C}}-\overset{|}{\underset{|}{C}}-OTeF_5 + Xe$$

While a similar reaction of SeF_5OF and $c-C_5F_8$ has previously been reported [5], and the displacement of chlorine from chlorocarbons using $Hg(OSeF_5)_2$ has yielded $-\overset{|}{\underset{|}{C}}-OSeF_5$ compounds [6], we are not aware of any studies of the fluorocarbon—$Xe(OSeF_5)_2$ reaction system. It was of interest therefore to

examine the possibility of preparing R_fOSeF_5 compounds using $Xe(OSeF_5)_2$. Furthermore, these derivatives would fill the gap between the newly discovered TeF_5O- substituted materials and the well known SF_5O- substituted analogues [7].

EXPERIMENTAL

Volatile materials were manipulated in a stainless steel vacuum line equipped with Teflon FEP U-traps, 316 stainless steel bellows-seal valves, and a Heise Bourdon tube-type gauge. The synthetic reactions employed here were usually conducted in stainless steel cylinders. Infrared spectra were recorded on a Perkin Elmer Model 283 spectrophotometer using cells equipped with AgBr windows. Raman spectra were recorded at ambient temperature on a Cary Model 83 spectrophotometer with the use of the 488-nm exciting line of an Ar ion laser. Sealed quartz tubes, 3mm OD, or Pyrex mp capillaries were used as sample containers. ^{19}F nmr spectra were recorded at 84.6 MHz on a Varian Model EM390 spectrometer with internal $CFCl_3$ as a standard with negative chemical shift being upfield from $CFCl_3$. Literature methods were used to synthesize XeF_2 [8] which in turn was employed to convert $SeOF_2$ to $Xe(OSeF_5)_2$ using a modification of a reported procedure [9]. Fluorocarbons used were commercial materials (SCM Specialty Chemicals).

For reactions with $Xe(OSeF_5)_2$ a tared, prepassivated cylinder was loaded with the solid xenon compound in the dry box. After evacuation the cylinder was cooled to $-196°$ and a measured quantity of olefin was condensed in. The closed cylinder was allowed to warm to ambient temperature before placing it in an oven at a higher temperature. It was found that little reaction occurred below $50°$ while above $65°$ a drastic fall off in the yield of R_fOSeF_5 compounds was experienced. The reactions were generally slow. Separation of the products was accomplished by fractional condensation. The R_fOSeF_5 materials were of intermediate volatility compared to the other products. Where necessary a quick water wash was used to preferentially react some impurities thereby permitting isolation of a particular R_fOSeF_5 product; eg., hydrolysis of $SeF_5OCFHCOF$ and SeF_5OCF_2COF to isolate $SeF_5OCF_2CFH(OSeF_5)$. However, contact with moisture must be minimized because even the saturated, non-functional R_fOSeF_5 type materials seemed sensitive to moisture and underwent slow decomposition when stored in glass. All of the R_fOSeF_5 compounds are colorless, mobile liquids of low volatility, although, as expected, slightly more volatile than their R_fOTeF_5 analogues.

In addition to the synthetic and spectroscopic data listed in the Tables, further properties are given below for some of the compounds.

$C_2F_5OSeF_5$-vapor density; Found 311, calc. 309 g/mol. For the range -45 to 0° log P_{mm} = 6.6198-1222/T°K with a calc. b.p. = 53.6° and ΔH_v = 5.59 kcal/mol; m.p. <-80°. $n-C_3F_7OSeF_5$-vapor density; Found 357, calc. 359 g/mol. For the range -32 to 11° log P_{mm} = 6.6263-1271/T K with a calc. b.p. = 66.2° and ΔH_v = 5.82 kcal/mol; m.p. <-80°. $c-C_5F_8O$-vapor density; Found 231, calc. 228 g/mol. IR (gas) cm^{-1} rel. intens., 1529s, 1370s, 1320s, 1293w, 1215vs, 1175w, 1088w, 1035w, 1000vs, 760vw, 615w, 560w, 455vw, and 419vw. Raman (liq.) cm^{-1} (rel. intens.), 1528(0.4), 1385(0.9), 1362(0.3), 1320(0.2), 1295(0.4), 1190(0.3), 1175(0.2), 1032(0.8), 868(0.2), 795(0.1), 755(0.2), 730(0.3), 678(10), 640(0.5), 617(0.5), 598(1.1), 585(0.8), 565(0.2), 455(1.4), 418(1.0), 372(5.2), 343(1.6), 310(0.3), 297(0.4), 245(0.3), 235(0.4), 190(0.3), and 112(0.2). Perfluoropropylene oxide was identified by its IR and ^{19}F nmr spectra [10]. Other known products were similarly identified by their IR [11] and ^{19}F nmr [12] spectra.

RESULTS AND DISCUSSION

The synthetic reactions are summarized in Table 1. It was found that the reactions of $Xe(OSeF_5)_2$ and simple olefins involve several paths. These include, 1) transfer of two SeF_5O- groups to the olefin; 2) transfer of one SeF_5O- group accompanied by fluorination; 3) transfer of two SeF_5O- groups followed by elimination of SeF_6 and generation of an acyl halide; 4) oxygenation to give an epoxide; and 5) oxygenation and rearrangement to an acyl fluoride. The mechanisms of these various paths are unknown. From the observation that only a narrow temperature range was useful in generating significant amounts of R_fOSeF_5 products and the fact that extensive oxygenation and fluorination also occurred, it seems likely that the activation energies for the formation and decomposition of SeF_5O radicals are similar. This causes competing side reactions resulting in the fluorination and oxygenation of the available substrates. These findings are in marked contrast to the analogous TeF_5O- chemistry where facile and efficient transfer of TeF_5O radicals, generated from $Xe(OTeF_5)_2$, to substrates can be achieved [1,2]. Only when the reaction temperatures exceeded 100°, did breakdown of the thermally more stable TeF_5O radical become significant [4]. Extensive degradation of the SeF_5O- group was also encountered in reactions of fluoroolefins with SeF_5OF [5] while TeF_5OF gave good yields of the corresponding TeF_5O- adducts [3].

TABLE 1

Fluoroolefin-Xe(OSeF$_5$)$_2$ reaction data

R$_f$ Compound mmol	Xe(OSeF$_5$)$_2$ mmol	T°C	Time	R$_f$OSeF$_5$ (% Yield)[a]	Vap. Pressure mm at 20°C	Other Products[b]
C$_2$F$_4$ 3.20	2.70	50	3d	C$_2$F$_5$OSeF$_5$(27), C$_2$F$_4$(OSeF$_5$)$_2$(10)	283[c], 18	CF$_3$CFO(40)
C$_3$F$_6$ 2.99	2.54	65	3.5d	C$_3$F$_7$OSeF$_5$(51), C$_3$F$_6$(OSeF$_5$)$_2$(11)	195[c], 14	C$_3$F$_6$O(36), C$_3$F$_8$
c-C$_5$F$_8$ 2.00	1.98	55-64	7d	c-C$_5$F$_9$OSeF$_5$(39)	20[d]	c-C$_5$F$_8$O(44), Xe(OSeF$_5$)$_2$(24)
C$_2$F$_3$Cl 3.87	3.17	62	1d	SeF$_5$OCF$_2$COCl(17), SeF$_5$OCF$_2$CFCl(OSeF$_5$)(10)	9	ClCF$_2$COF(52), C$_2$F$_5$Cl, Xe(OSeF$_5$)$_2$
C$_2$F$_3$H 3.94	3.74	55	3d	SeF$_5$OCFHCF$_2$(OSeF$_5$)(37)	10	SeF$_5$OCFHCOF, C$_2$F$_5$H, SeF$_5$OCF$_2$COF,

[a] Yields based on olefin taken.

[b] In all cases varying amounts of all or several of the following compounds were also observed: Xe, SeF$_6$, SeF$_4$, SeOF$_2$, and SeF$_5$OH.

[c] Extrapolated

[d] Reference 5

TABLE 2

^{19}F NMR data for R_fOSeF_5 compounds[a]

```
  ┌──219──┐┌──9.5──┐┌──2.4──┐              ┌──221──┐
F ───────SeF₄O───────CF₂──────CF₃        F ───────SeF₄O──CF₂──COCl
71.3A   73.4tB₄   -86.4qi  -87.9t        61.4A   73.6B₄   -63.5bs
```

```
                  ┌────7.5────┐
  ┌──217──┐┌──9.0──┐┌──1.8──┐              ┌──220──┐┌──10.2──┐
F ───────SeF₄O───────CF₂──────CF₂─────CF₃  (F ───────SeF₄O───────CF₂──)₂
66.3A   77.8tB₄   -81.1cm  -129.7t  -82.8t  62.1A  78.6tB₄    -79.3cm
```

```
  ┌──221──┐
F ───────SeF₄O.      F        φFor CF
62.2A   73.4B₄    ╲  ╱  1      -125.6  ┐
              ╱ ╲╳            -130.5  ┘ AB quadruplet From C₃ and C₄, J_AB=254
            5   F   2
                             -133.3  ┐
            4       3         -133.6
                             -136.4  ┘ AB quadruplet From C₂ and C₅, J_AB=254
                             -136.6
                             -132.5  ⟩ cm From C₁
```

```
                              CF₃ -80.9cm
  ┌──221──┐┌──9.8──┐           │
F ───────SeF₄O───────CF₂──────C────F    ┐
65.7A   78.6tB₄   -79.3cm      │   -136.0qi   18.3
                              O           ┘
                              │           ┐
                              SeF₄  80.9dB₄  237
                              │           ┘
                              F     66.9A
```

```
                  ┌────1.9────┐
  ┌──219──┐┌──9.4──┐┌──9.5──┐┌─4.7─┐┌──226──┐
F ───────SeF₄O───────CF₂──────CFH──────OSeF₄──────F
63.1A   73.7tB₄   -81.9b,st -137.9dqi 58.4dB₄    65.6A
```

$\delta=5.98d(J_{HF}=53)$ of $t(J_{HF'}=1.9)$

```
  ┌──225──┐┌──9.2──┐          ┌──10.4──┐┌──222──┐
F ───────SeF₄O───────CF₂──────CFCl──────OSeF₄──────F
64.1A   75.8tB₄   -81.4qi  -73.0qi    74.8A    63.3dB₄
```

[a] $CFCl_3$ reference, negative shift being upfield from the reference, φ=chemical shift, ppm, J=Hz, where b=broad, s=singlet, d=doublet, t=triplet, st=sextet, qi=quintet, cm=complex multiplet. The area ratios measured for these resonances agreed with the given assignments.

Table 2 lists the ^{19}F and ^{1}H nmr data for the new compounds. The magnetic inequivalence of the axial fluorine compared to the four basal fluorines in the SeF_5O- group gives rise to AB_4 type spectra. Chemical shifts and coupling

TABLE 3

Vibrational spectra of R_fOSeF_5 compounds and $C_2F_5OTeF_5$

Assign.[b]	C2F5OSeF5 IR(gas)	C2F5OSeF5 Raman(liq.)	n-C3F7OSeF5 IR(gas)	n-C3F7OSeF5 Raman(liq.)	C2F5OTeF5 IR(gas)	C2F5OTeF5 Raman(liq.)
		1382(0.7)dp				1392(0.8)dp
		1345(0.1)	1348 mw	1358(0.3)dp		
		1295(0.05)	1314 m	1325(0.8)p		
νCF	1250 vs	1245(0.1)	1250 vs		1247 vs	1240(0.1)
	1198 m	1200(0.1)	1210 m	1215(0.2)p		
	1180 s	1175(0.3)p	1180 m	1175(0.1)	1190 vs	1185(0.1)p
			1164 m			
			1148 s	1147(0.4)p		
νCO	1105 s	1102(0.4)p			1110 vs	1105(0.3)p
νCC			1001 s	1010(0.5)p		
				910(0.1)		
δCF_2	860 w	857(0.4)p	835 w	840(0.4)p		868(0.5)p
				825(0.4)p		
$\nu_{as}XF_4$	768 s	770(0.2)	765 vs		745 vs	742(0.8)p
		748(0.4)p		753(1.1)p		
$\nu XF'$	735 m	733(0.8)p	735 s	735(1.0)p	722 s	719(1.8)p
		718(0.6)p				
νOX and		698(10)p		700(8.1)p		690(9.2)p
$\nu_s XF_4$ ip		670(4.2)p		675(10)p		678(10)p
$\nu_s XF_4$ op		652(4.2)dp		652(1.7)dp		615(0.2)dp
		615(0.2)		622(0.4)p		
				595(0.5)p		558(0.7)p
	540 vw	560(0.6)p	570 vw	565(0.3)p		525(0.2)p
				535(0.6)p		367(0.7)p
$\delta_s XF_4$ opl	432 s	423(0.4)dp	437 s	424(0.7)dp	328 s	320(1.2)dp
δOXF_4 and		398(0.8)dp		398(1.1)dp		311(1.3)dp
δFXF_4				380(0.4)p		
		370(0.4)p		362(0.6)p		294(1.3)p
				348(0.7)p		270(1.3)p
$\delta_{as}XF_4$ ipl		335(1.7)dp		340(1.5)dp		262(1.3)dp
		304(0.7)p		317(0.6)		
		222(1.4)p		220(1.2)p		
				188(0.9)p		
		174(1.4)p		165(1.4)p		181(1.5)p
		145(0.2)p		147(0.8)p		153(1.1)p

[a] Uncorrected Raman intensities (peak heights)

[b] X = Se or Te; ip = in phase; op = out of phase; opl = out of plane; ipl = in plane

constants are found in a narrow range: A = 61-66 and B_4 = 73-79 ppm except for SeF_5O- attached to CFH where the B_4 resonance shifts markedly to 58.4 ppm. In unsymmetrical $R_f(OSeF_5)_2$ type compounds the inequivalence of the two SeF_5O- groups is readily discernible. For the CF fluorines first order nmr spectra are observed except for $c-C_5F_9OSeF_5$ which shows a second order A_4B_4C type pattern similar to that of $c-C_5F_9OCF_3$ [13].

Vibrational spectra are given in Tables 3-5. For comparison the previously unreported Raman spectrum of $C_2F_5OTeF_5$ is included in Table 3. The strong infrared bands in the region 1300-900 cm^{-1} are characteristic for C-F and C-O

TABLE 4

Vibrational spectra of R_fOSeF_5 compounds

| | Obsd. Freq., cm^{-1} (rel. intens.)[a] | | | | | |
| | $SeF_5OCF_2CF_2OSeF_5$ | | $CF_3CF(OSeF_5)CF_2OSeF_5$ | | $c\text{-}C_5F_9OSeF_5$ | |
Assign.[b]	IR(gas)	Raman(liq.)	IR(gas)	Raman(liq.)	IR(gas)	Raman(liq.)
		1345(1.7)p			1370 w	1370(0.1)
			1318 w	1338(0.6)	1323 s	1320(0.2)
νCF			1274 m	1282(0.5)	1290 m	1290(0.2)
	1255 vw	1250(0.05)	1245 vs		1272 m	1270(0.2)
	1222 s	1205(0.2)	1180 sh		1230 vs	
	1190 s	1178(0.5)p	1165 s	1173(0.5)p	1168 s	1160(0.2)p
νCO	1098 s	1095(0.05)	1115 s	1118(0.2)p	1087 w	1078(0.1)
νCC					1040 w	1043(0.1)
	965 vw	945(0.1)p	986 s	995(0.3)p	990 vs	980(0.6)p
δCF_2	905 vw	885(0.3)p	850 vw	855(0.3)p		883(0.1)p
	845 vw		832 vw			
$\nu_{as}SeF_4$	777 s	770(0.3)p	768 vs	770(0.3)p	773 vs	775(sh)
$\nu SeF'$	740 s	737(0.7)p	732 s	724(5.0)p	740 sh	748(0.3)p
		715(5.2)p	724 mw		718 m	715(1.2)p
$\nu_s SeF_4 ip$		680(10)p		675(10)p		678(10)p
νSeO	675 vw	670(sh)p	675 ww		660 vw	
$\nu_s SeF_4 op$		653(1.2)dp	650 vvw	652(1.5)dp	640 w	652(sh)
		590(0.4)p	570 w	575(0.2)	610 w	600(0.3)p
				560(0.3)p	575 vw	582(0.4)p
				540(0.2)	525 w	525(0.2)p
		440(0.2)p	435 sh	445(0.2)p	438 vs	440(sh)
$\delta_s SeF_4 opl$	431 s	425(0.4)dp	425 s	425(0.4)dp		420(0.4)dp
$\delta OSeF_4$ and		398(0.8)dp		398(0.7)dp		396(0.6)dp
$\delta FSeF_4$		340(0.5)p		345(0.3)p		355(1.0)p
$\delta_{as}SeF_4 ipl$		332(0.8)dp		330(0.7)dp		330(0.6)dp
		310(0.4)p		310(0.4)p		300(sh)
		240(0.1)p		227(0.7)p		223(0.3)p
		223(1.0)p		195(0.5)p		180(1.2)p
				178(0.3)p		170(1.2)p
		140(2.5)p		140(1.5)p		106(0.1)p

[a] Uncorrected Raman intensities (peak heights)

[b] ip = in phase; op = out of phase; opl = out of plane; ipl = in plane

stretching motions. For all the SeF_5O- compounds intense infrared bands are found at about 770, 740, and 430 cm^{-1} which are attributable to $\nu_{as}SeF_4$, $\nu SeF'$, and $\delta_s SeF_4$, respectively, of the SeF_5O- group. These assignments correspond closely to those given for other SeF_5O- [14] and SeF_5- [15] containing molecules.

Raman counterparts exist for many of these infrared bands, although they are, as expected, of relatively low intensity, especially for the C-F and C-O vibrations. The Raman spectra are generally dominated by a polarized band near 675 cm^{-1} which is assigned to the symmetric SeF_4 stretching mode, and which has no infrared counterpart. An analogous strong Raman feature was also observed for the νTeF_4 motion in R_fOTeF_5 compounds [1-4]. Four Raman bands at about 425, 398, 370, and 330 cm^{-1} are attributed to $\delta_s SeF_4$ out of plane, $\delta OSeF_4$, $\delta FSeF_4$, and $\delta_{as}SeF_4$ in plane modes, respectively.

TABLE 5

Vibrational spectra of R_fOSeF_5 compounds

| | Obsd. Freq., cm^{-1} (rel. intens.)[a] | | | | | |
| | SeF$_5$OCF$_2$CFH(OSeF$_5$) | | SeF$_5$OCF$_2$CFCl(OSeF$_5$) | | SeF$_5$OCF$_2$COCl | |
Assign.[b]	IR(gas)	Raman(liq.)	IR(gas)	Raman(liq.)	IR(gas)	Raman(liq.)
νCH	3020 vw	3010(0.1)p				
νC=O					1843 s	1845(0.4)p
δCHwag	1395 w	1395(0.9)p				
δCHrock	1355 w	1360(0.2)				
νCF	1280 m	1275(0.5)p	1300 w	1303(1.3)	1300 vw	
	1258 w	1255(0.3)	1272 vw	1272(0.2)		1273(0.2)
			1248 ms	1243(0.2)	1246 m	1242(0.8)p
	1188 s	1180(0.2)p	1207 ms	1214(0.2)		
	1152 s	1145(0.4)p	1178 s	1172(0.3)	1197 s	1190(0.2)
	1123 ms	1118(0.3)p	1140 ms	1135(0.3)		
νCO	1088 s	1080(0.2)	1090 s	1085(0.4)	1093 s	1088(0.4)p
νCC	940 m		977 ms	976(0.2)	970 s	965(0.4)p
	905 m	900(0.3)p				
δCF$_2$	830 w	838(1.4)p	845 w	852(0.3)	822 m	825(0.6)p
	802 w		803 w			
ν$_{as}$SeF$_4$	770 vs	760(0.4)p	770 vs	765(0.3)	770 vs	760(0.4)p
νSeF'	740 s	732(1.9)p	742 ms	735(sh)	740 s	725(sh)
	710 m	709(8.6)p	728 ms	723(2.0)		
		688(6.6)p				685(sh)
ν$_s$SeF$_4$ip		675(10)p		672(10)		675(10)p
νSeO	655 w	665(8.8)p		651(1.7)		650(sh)
ν$_s$SeF$_4$op		645(sh)dp		638(sh)		
		628(1.6)p		580(0.1)		618(2.1)p
		550(0.5)p		560(0.2)		
				475(0.3)		480(0.3)p
		445(0.4)p		442(0.4)		440(1.8)p
δ$_s$SeF$_4$opl	430 s	420(0.9)dp	428 s	425(0.6)	432 s	425(sh)
δOSeF$_4$ and		395(1.2)dp		397(1.0)		399(1.1)dp
δFSeF$_4$		352(0.9)p				368(0.7)p
δ$_{as}$SeF$_4$ipl		330(0.7)dp		328(0.6)		340(0.9)dp
		310(0.5)p		316(0.6)		310(0.3)
		260(0.3)p		245(0.2)		
		228(0.9)p		230(0.4)		239(2.6)p
				218(0.6)		200(1.2)p
		150(sh)		184(0.5)		160(1.6)p
		135(2.3)p		140(1.7)		100(0.3)dp

[a]Uncorrected Raman intensities (peak heights)

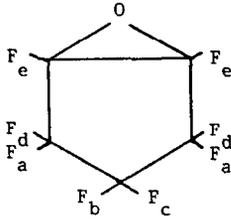[b]ip = in phase; op = out of phase; opl = out of plane; ipl = in plane

For SeF$_5$OCF$_2$CFH(OSeF$_5$) both the infrared and Raman spectra contain bands at about 3015, 1395 and 1360 cm^{-1} which are attributable to νCH, δCHwag, and δCHrock, respectively. A band typical for νC=O is observed at 1845 cm^{-1} for SeF$_5$OCF$_2$COCl in both the infrared and Raman spectra. All of the spectral data agree with the formulation of these compounds as R_fOSeF_5 moieties.

The unexpected formation of epoxides in some of the Xe(OSeF$_5$)$_2$ reactions was limited to C_3F_6O and $c-C_5F_8O$, probably because the remaining olefins studied do not form epoxides which are stable under these conditions. While C_3F_6O is

well known, the cyclic epoxide $c-C_5F_8O$ is not and is mentioned only in the patent literature [16]. The infrared and Raman spectra of $c-C_5F_8O$ clearly show a strong band near 1530 cm^{-1} which is attributable to a stretching motion of a fluorinated epoxide. In addition to strong infrared bands in the region 1370-1215 cm^{-1} due to νCF, there is an intense band at 1000 cm^{-1} assignable to a C_5 ring stretching motion [11]. The ^{19}F nmr spectrum of $c-C_5F_8O$ is complex and its approximate analysis is given in Table 6.

TABLE 6

^{19}F NMR data for $c-C_5F_8O$

F	Area	ppm	Bands[†]	Coupling Hz
a	2	-122.6	dm	$J_{ad} = 259$
b	1	-125.2	d	$J_{bc} = 247$
c	1	-140.2	dqi	$J_{bc} = 247$, $J_{ac}=J_{ce} = 4.6$
d	2	-141.0	dsp	$J_{ad} = 259$, $J\approx2.1$
e	2	-187.4	sp	$J_{ce} = 4.6$[††]

[†] d=doublet, qi=quintet, sp=septet, m=multiplet

[††] Spectra need further computer analysis to extract J_{ae} which is probably about 4.5 Hz.

The stability of this epoxide is exemplified by the fact that it was unaffected by long contact with CsF at 50°.

CONCLUSION

Due to its lower thermal stability and greater oxidizing power, the SeF_5O radical cannot be added as cleanly to olefinic double bonds as the TeF_5O radical. The yields of the R_fOSeF_5 adducts are decreased by competing side reactions involving fluorination, oxidation, and epoxidation of the substrates. All of the synthesized R_fOSeF_5 compounds are similar to their R_fOTeF_5 analogues.

ACKNOWLEDGEMENT

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