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ALTHOUGH SF<sub>5</sub>Cl<sup>1</sup> and SF<sub>5</sub>Br<sup>2</sup> have been prepared, only a very few other compounds of the type  $MF_5X$  (X = halogen) have been reported.<sup>3,4</sup> We have synthesised the corresponding tellurium compounds TeF<sub>5</sub>Cl and TeF<sub>5</sub>Br by the action of fluorine diluted with nitrogen on tellurium tetrachloride and tetrabromide respectively, using a flow method at 25°. In both cases large proportions of tellurium hexafluoride and free halogen also appear. The new halide pentafluorides have been characterised by their <sup>19</sup>F n.m.r. spectra, which are typical of  $AB_4$  systems (cf. other TeF<sub>5</sub> derivatives<sup>5,6</sup>). Solvent shifts of the order 1 p.p.m. were observed; the quoted values are for dilute solutions in CFCl<sub>3</sub> (TeF<sub>5</sub>Cl;  $\delta_A + 42.7$  p.p.m.,  $\delta_B + 4.0$  p.p.m.,  $J_{AB}$  173 c./sec.; TeF<sub>5</sub>Br;  $\delta_A$ +39.2 p.p.m.  $\delta_{B} - 12.5$  p.p.m.,  $J_{AB}$  166 c./sec.). These fluorine-fluorine coupling constants are comparable with those of other TeF<sub>5</sub> systems<sup>5,6</sup> but shifts of the equatorial fluorine atoms are much further downfield as found in SF5Cl and SF<sub>5</sub>Br.<sup>7</sup> Tellurium-fluorine coupling was also observed. The mass spectrum of TeF<sub>5</sub>Cl showed, besides other fragments, the presence of the parent ion, but under the conditions of measurement the parent ion of TeF<sub>5</sub>Br was not observed. The gas-phase i.r. spectra gave the following very strong bands: TeF<sub>5</sub>Cl, 726 and 317; TeF<sub>5</sub>Br, 717, and 329 cm.-1.

Both new compounds are low-boiling liquids. Although halogen-free samples have not yet been obtained, a number of chemical reactions have been investigated. Tellurium bromide pentafluoride may be converted to tellurium chloride pentafluoride by reaction with chlorine at room temperature under the influence of u.v. irradiation. Both compounds react with olefins at room temperature under u.v. irradiation, e.g. tellurium bromide pentafluoride with ethylene yields 1bromo-2-fluoroethane and tellurium tetrafluoride. Evidence has not yet been obtained for insertion reactions in which the  $TeF_5$  entity is retained, as occurs with SF<sub>5</sub>Cl. With phosphorus trifluoride, TeF<sub>5</sub>Cl yields PF<sub>3</sub>Cl<sub>2</sub>, PF<sub>4</sub>Cl,<sup>8</sup> and some PF<sub>5</sub>, but  $TeF_5Br$  gave only  $PF_5$  as a volatile product.

Attempts to prepare TeF<sub>5</sub>I by similar methods have not been successful, the products being  $TeF_6$ and IF<sub>5</sub>.

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