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SHORT COMMUNICATION

The Structure of VF₅ in Solution

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There are continuing studies of the structure of VF₅ in solution¹, although its structure in the solid state is known². It has been established that liquid VF₅ is polymeric³. Its extreme reactivity and low solubility severely limits the number of satisfactory solvents. At low temperature in SO₂ClF as solvent the ¹⁹F resonance spectrum was found to consist of three lines with intensity ratios of 2:2:1, without resolvable fine structure⁴. The spectrum was interpreted as arising from chains, either linear or cyclic, of cis-fluorine bridged VF₆ units.

It has recently been possible, by accurate control of sample temperature, to get better results at the freezing point of the solution. The experimental spectrum (fig. 1) can be closely matched by a theoretical spectrum (fig. 1) calculated for a cis-bridged linear structure with the parameters of fig. 2. The extra lines to low field of the resonances of fluorines 5 are postulated to come from end units of the relatively short chains. From the relative areas of these signals the average chain has five VF₅

* Issued as NR

units. These results are not compatible with individual VF_5 units or transbridged chains but provide stronger evidence that VF_5 exists in solution as short, linear, cis-fluorine bridged chains.

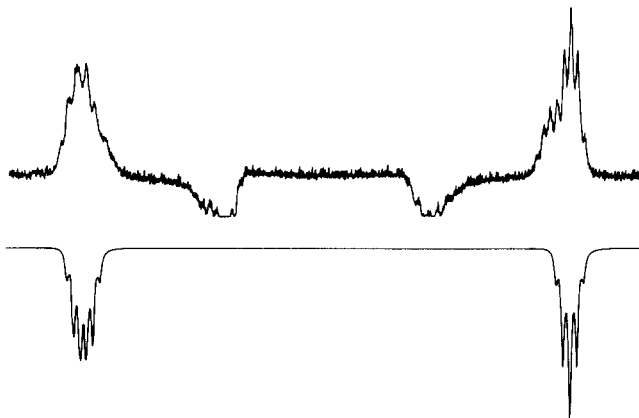


Fig.1. Experimental spectrum

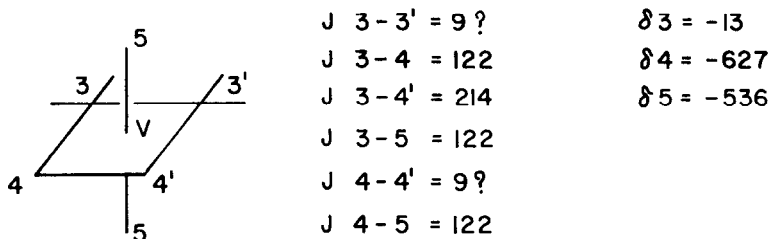


Fig.2. Theoretical spectrum

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