

## *Supporting Information*

### **From Hexafluoropropylene to Perfluoroisobutyronitrile via High-Yield and Scalable Three-Step Synthesis**

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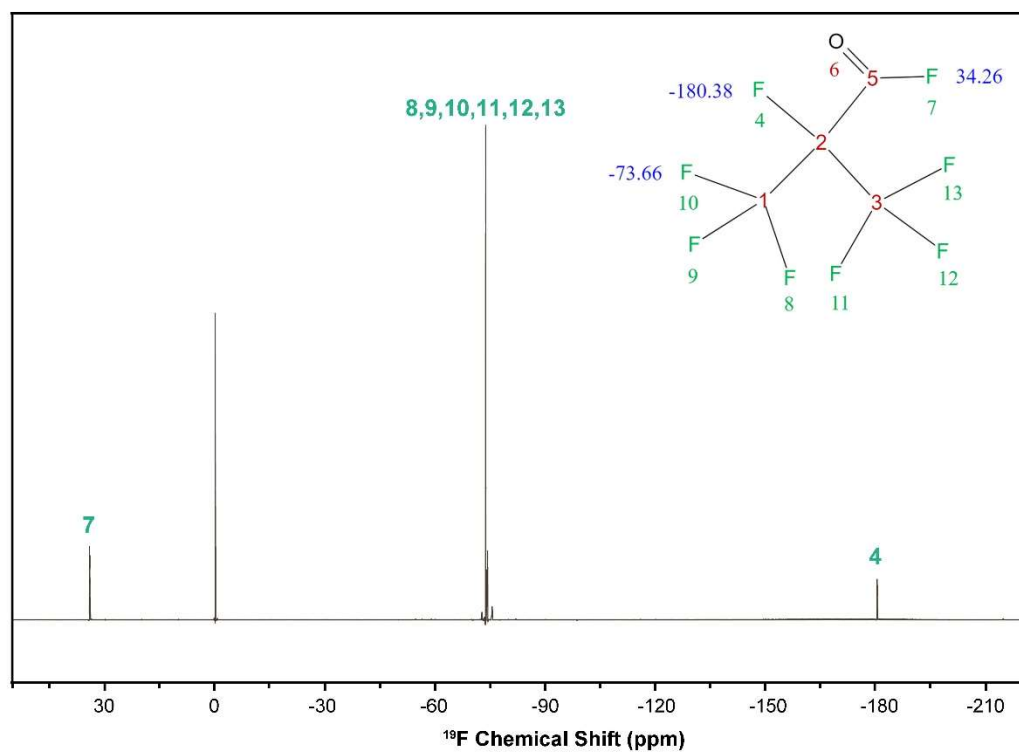
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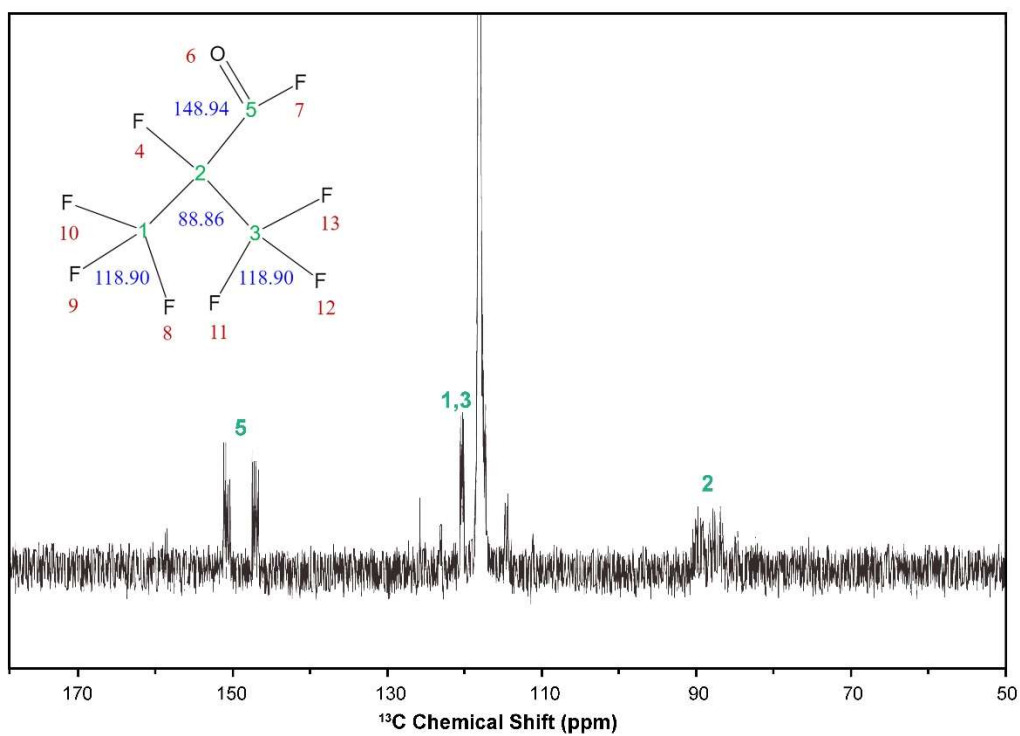
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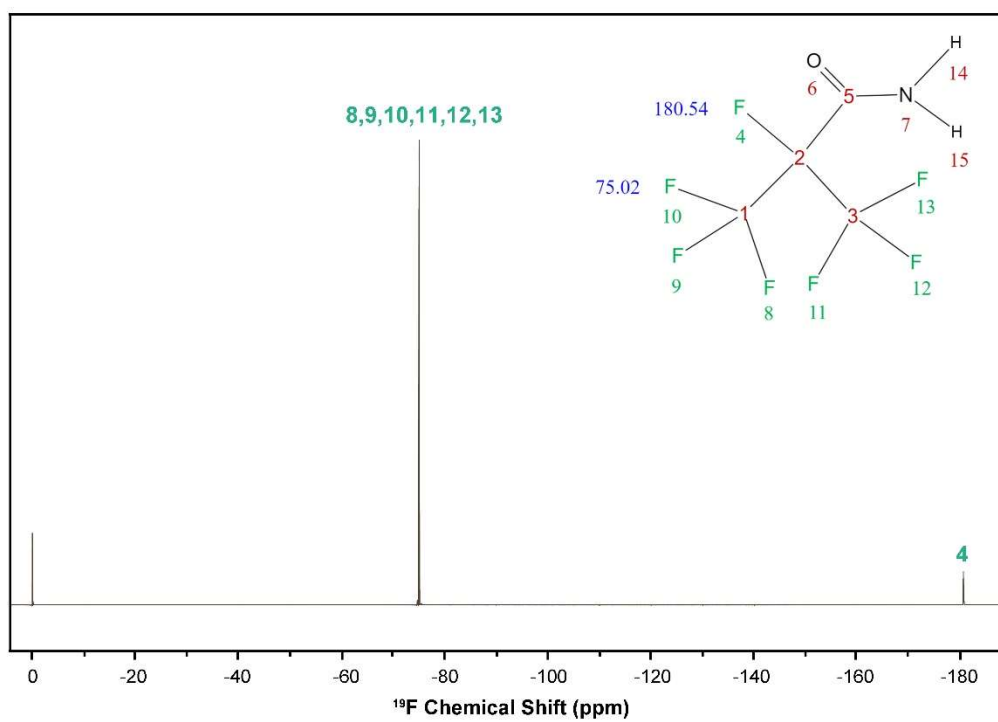
## Additional Data



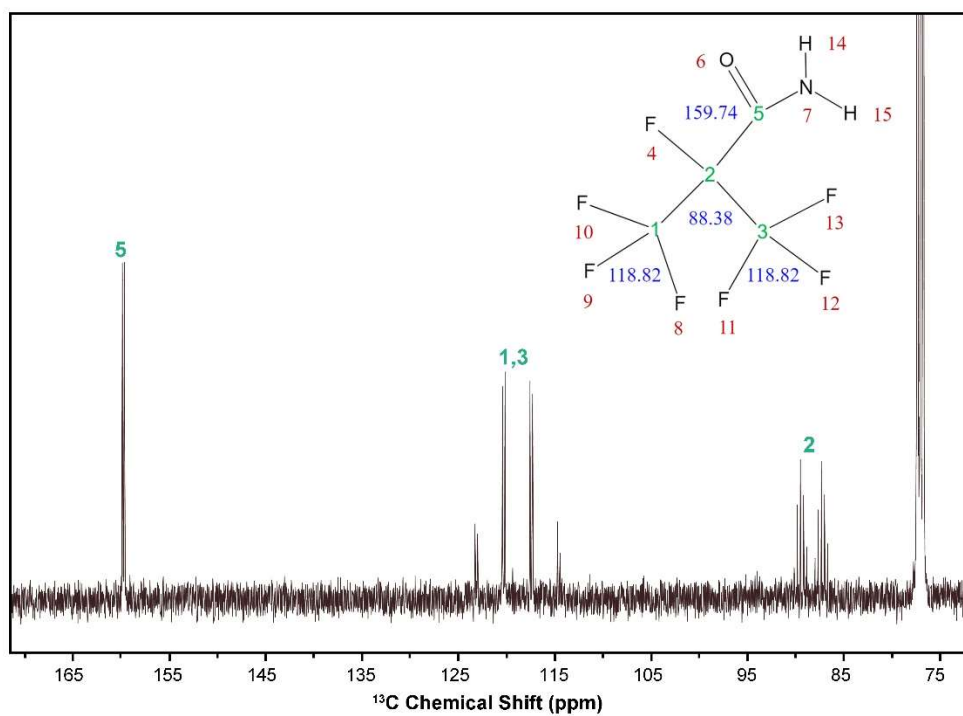
**Figure S1.**  $^{19}\text{F}$  NMR spectrum of perfluoroisobutyryl fluoride



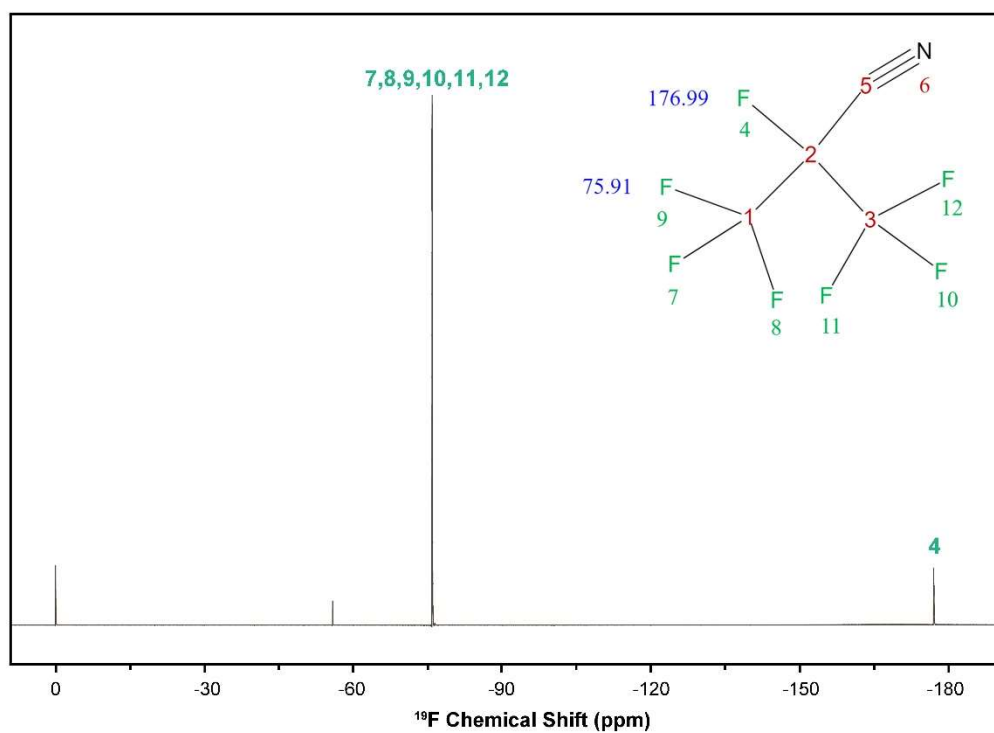
**Figure S2.**  $^{13}\text{C}$  NMR spectrum of perfluoroisobutyryl fluoride



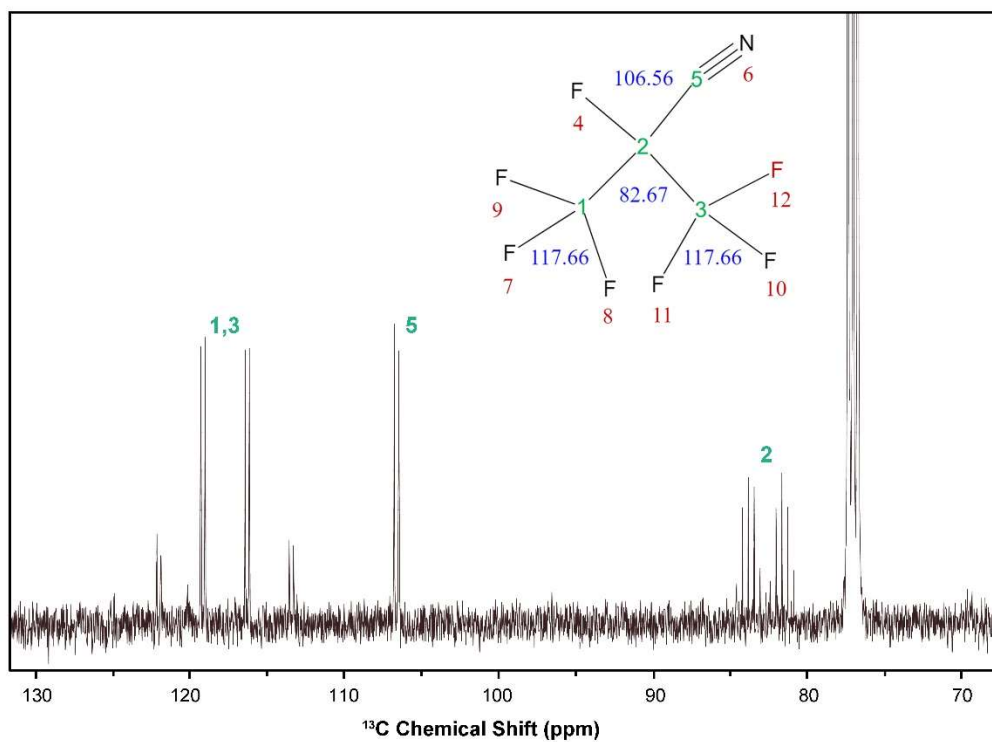
**Figure S3.**  $^{19}\text{F}$  NMR spectrum of heptafluoroisobutyramide



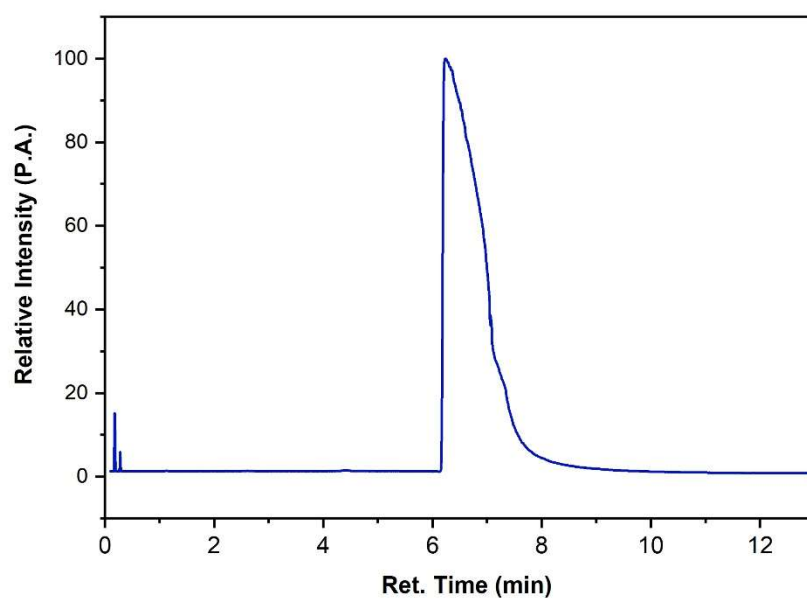
**Figure S4.**  $^{13}\text{C}$  NMR spectrum of heptafluoroisobutyramide



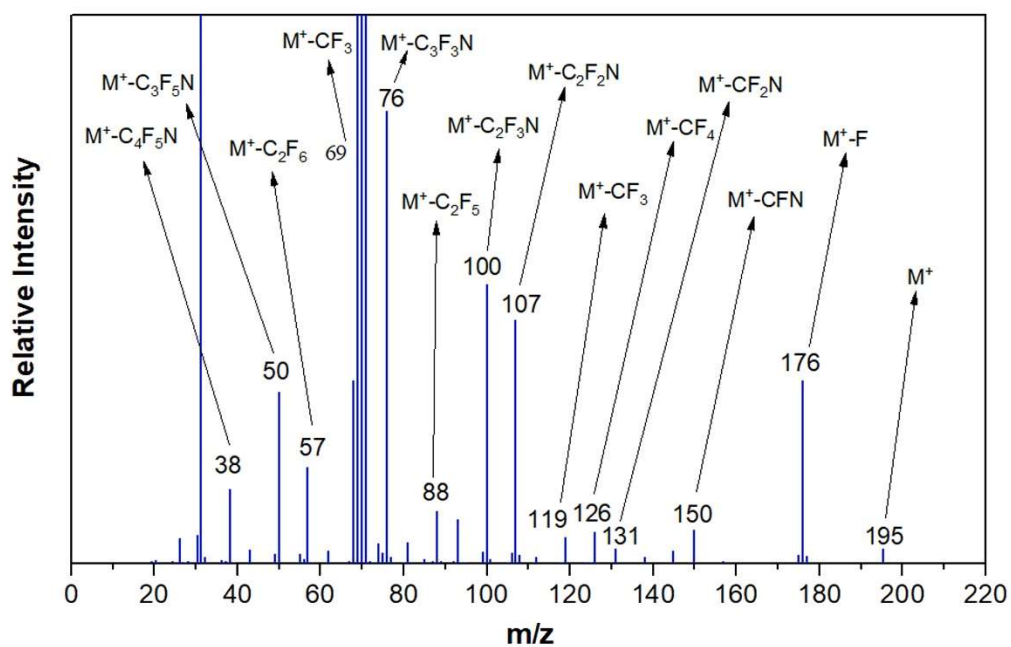
**Figure S5.**  $^{19}\text{F}$  NMR spectrum of perfluoroisobutyronitrile



**Figure S6.**  $^{13}\text{C}$  NMR spectrum of perfluoroisobutyronitrile



**Figure S7.** GC spectrum of perfluoroisobutyronitrile



**Figure S8.** MS spectrum of perfluoroisobutyronitrile

**Table S1.** The reaction efficiency of heptafluoroisobutyramide dehydration at varying P<sub>2</sub>O<sub>5</sub> feed ratios

SN	n(heptafluoroisobutyramide) /n(P <sub>2</sub> O <sub>5</sub> )	Yield/%	Purity/%
1	1/1	20.3	99.6
2	1/2	57.0	99.5
3	1/3	84.1	99.7
4	1/5	90.0	99.9