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## XENON-NITROGEN BONDED COMPOUNDS

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The crystal structure of xenon(II) fluoride imidodisulfonyl fluoride has been determined at  $-55^{\circ}\text{C}$  from three-dimensional X-ray data. The compound crystallizes in the monoclinic system, space group  $\underline{P}2_1/a$ , with four molecules in a unit cell of dimensions  $\underline{a}=11.827(4)$ ,  $\underline{b}=6.828(2)$  and  $\underline{c}=9.467(3)\text{\AA}$ . The structure was refined by least-squares and Fourier methods to a final  $R$  factor of 0.023 for 1721 non-zero reflections. The structure analysis has established the existence of discrete  $\text{FXeN}(\text{SO}_2\text{F})_2$  molecules and shows that  $\text{FXeN}(\text{SO}_2\text{F})_2$  is Xe-N bonded. The xenon atom is approximately linearly coordinated by the nitrogen atom of the imidodisulfonyl fluoride group and a fluorine atom. The angle  $\text{F-Xe-N}$  is  $178.1(1)^{\circ}$ , and the interatomic distances are  $\text{Xe-N} = 2.200(3)$  and  $\text{Xe-F} = 1.967(3)\text{\AA}$ . Raman spectral data and assignments are also presented for  $^{15}\text{N}$ -enriched  $\text{FXeN}(\text{SO}_2\text{F})_2$ ,  $\text{HN}(\text{SO}_2\text{F})_2$  and  $\text{Cs}^*\text{N}(\text{SO}_2\text{F})_2$ . Solution  $^{15}\text{N}$ ,  $^{129}\text{Xe}$  and  $^{19}\text{F}$  N.M.R. studies of  $^{15}\text{N}$ -enriched  $\text{FXeN}(\text{SO}_2\text{F})_2$  and  $\text{Xe}[\text{N}(\text{SO}_2\text{F})_2]_2$  demonstrate that these compounds are also Xe-N bonded in solution. The first examples of a directly bonded  $^{129}\text{Xe}$ - $^{15}\text{N}$  coupling are also reported.

The new xenon compound  $[(\text{CF}_3\text{SO}_2)_2\text{N}]_2\text{Xe}$  has also been obtained in high yield by a novel route employing the reaction of the trimethylsilyl derivative of  $\text{HN}(\text{SO}_2\text{CF}_3)_2$  with  $\text{XeF}_2$ . Although quite stable,  $\text{Xe}[\text{N}(\text{SO}_2\text{CF}_3)_2]_2$  exhibits a decomposition route in stark contrast to the related compound  $\text{Xe}[\text{N}(\text{SO}_2\text{F})_2]_2$  forming  $\text{Xe}$ ,  $\text{C}_2\text{F}_6$ ,  $\text{CF}_3\text{N}(\text{SO}_2\text{CF}_3)_2$  and  $\text{CF}_3\text{SO}_2\text{NSO}_2$ .

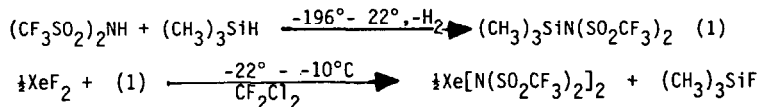
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## BIS[BIS(TRIFLUOROMETHANESULFONYL)IMIDO] XENON: A NEW EXAMPLE OF A COMPOUND CONTAINING XENON-NITROGEN BONDS

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As a complement to the previously unique xenon-nitrogen system  $[\text{XeF}_2 + \text{HN}(\text{SO}_2\text{F})_2]$ ,  $\text{Xe}[\text{N}(\text{SO}_2\text{CF}_3)_2]_2$  is presented here as the sole xenon-containing product from the reaction of  $\text{XeF}_2$  with  $(\text{CF}_3\text{SO}_2)_2\text{NH}$ . Yield and purity of the title compound was greatly enhanced by the use of an intermediate trimethylsilyl derivative of the parent acid:



$\text{Xe}[\text{N}(\text{SO}_2\text{CF}_3)_2]_2$  is a brilliant white solid stable to  $72^{\circ}$  at which point it decomposes rapidly and cleanly to readily identifiable products. Formation of HF, albeit the driving force for many  $\text{XeF}_2$ -protic acid reactions, is well known to be detrimental towards many bonds to xenon. This first successful use of a silylated reagent to avoid HF formation in xenon chemistry demonstrates yet another synthetic alternative. Synthesis and analysis of the title compound will be discussed, as well as the mechanistic pathways of formation and controlled decomposition.