

Synthesis and characterization of rare zwitterionic species containing tellurium(II)

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Abstract

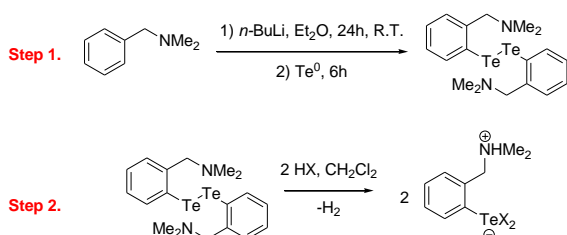
Three new tellurium zwitterionic compounds were synthesized from *N,N*-dimethylbenzylamine ditelluride.

Introduction

Tellurium compounds have been studied in several chemistry branches, for example, as intermediate in organic chemistry and in materials science.¹ In the solid state, their structures have a quaint behavior and display different arrangements depending on the atoms attached to tellurium when secondary bonds (non-covalent interactions)² are formed. Nevertheless, few structures of tellurium-based zwitterionic compounds are reported.³ In this work, we describe the synthesis three new zwitterions starting from *N,N*-dimethylbenzylamine ditelluride by protonation with hydrohalic acids.

Results and Discussion

The zwitterionic compounds were synthesized according to scheme 1.



Scheme 1. Synthetic route to obtain the compounds of interest.

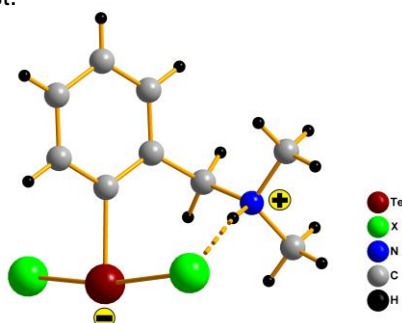


Figure 1. Crystallographic projection of the monomeric unit $C_9H_{13}N^+TeX_2^-$ ($X = Cl, Br$ and I).

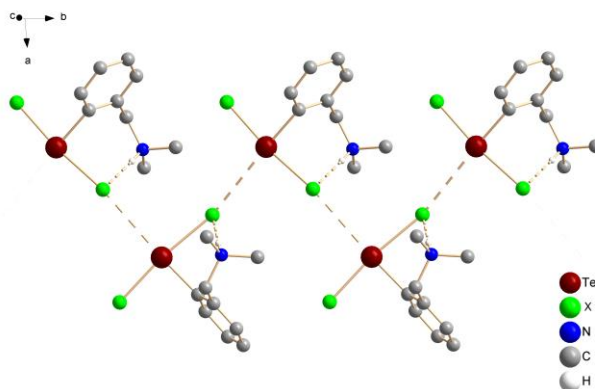


Figure 2. Crystallographic projection of pseudo-polymeric arrangements $C_9H_{13}N^+TeX_2^-$ ($X = Cl, Br$ and I). C-H bonds are not depicted.

The compounds show a pseudo-polymeric structure which has a secondary bond between $H \cdots X$ (as show figure 1) and $Te \cdots X$ secondary bonds which leads to supramolecular pseudo-polymeric chain along to the *b* axis (as shown in figure 2).

Conclusion

We have successfully synthesized three new tellurium-based zwitterionic compounds with isostructural pseudo-polymeric arrangements built up by $Te \cdots X$ non-covalent interactions. These interactions show a predominance to drive the building of the supramolecular architectures in the presence of ionic charges. It points to the ionic charges are committed essentially with inner bonds. Ongoing studies about this subject are in progress.

Acknowledgements

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¹ Basmadjian, G. P. et al, *J. Label. Comp. Radiopharmaceuticals*, **1979**, 16, 33.

² Alcock, N. W., *Adv. Inorg. Chem. Radiochem.*, **1972**, 15, 1

³ (a) Bergman, J.; Siden, J.; Maartmann-Moe, K. *Tetrahedron*, **1984**, 40, 1607; (b) Eveland, J.R.; Whitmire, K. H. *Angew. Chem. Int. Ed. In Engl.*, **1997**, 36, 1193; (c) Kunnari, S. M., Oilunkaniemi, R., Laitinen, R. S., Ahlgrén M. *J. Chem. Soc., Dalton Trans*, **2001**, 3417, (d) Gushwa, A. F.; Karlin, J. G.; Fleischer, Ray A; Richards, A. F. *J. Organomet. Chem.*, **2006**, 691, 5069, (e) Hitchcock, P. B., Lappert, M. F., Li, G, *Inorg. Chim. Acta*, **2009**, 362, 3982, (f) dos Santos, S. S., Cabral, B. N., Abram, U., Lang, E. S, *J. Organomet. Chem.*, **2013**, 115, 723.