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Studies into the synthesis of azolopyrrolidinobenzodiazepinones and related compounds. Oxidative cyclisations, oxidative fragmentations and oxidative rearrangements in the reactions of azolylmethyl-*N*-phenyl-lactams and related compounds with cerium (IV) ammonium nitrate

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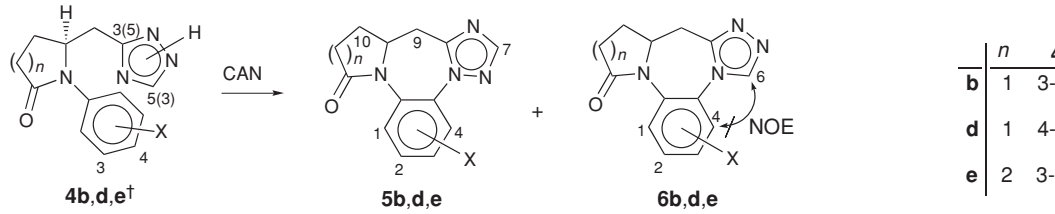
Depending on the nature of the bridge connecting the two hetero rings of the substrates of types **4**, **7**, **11** and **12** studied, the substrates are attacked by CAN at different sites and, therefore, afford different types of oxidation products.

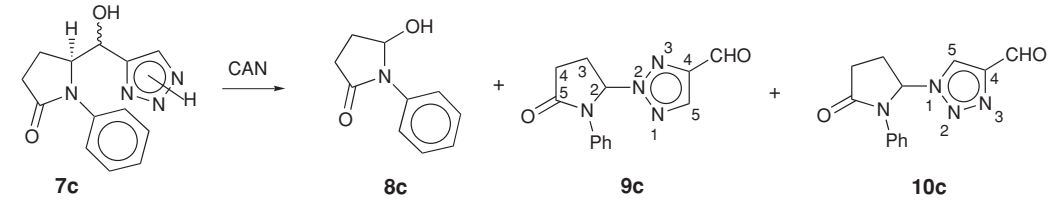
Keywords: azolopyrrolidinobenzodiazepinones, cerium (IV) ammonium nitrate

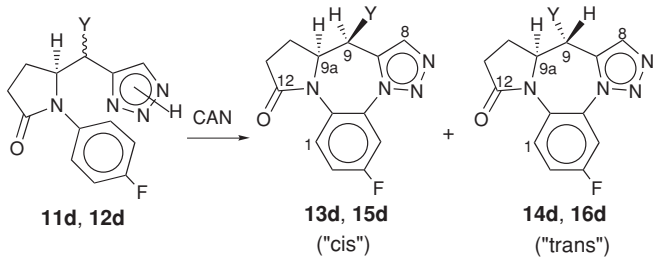
In continuation of earlier studies[3] a series of azolylmethyl-*N*-phenyllactams and related compounds (**4b**, **4d, 4e, 7c**, **11d** and **12d**) were subjected to oxidation with cerium(IV) ammonium nitrate (CAN).

While the substrates of types **4**, **11** and **12**, in which the two hetero rings are separated by methylene, acetoxymethylene and chloromethylene bridges, respectively, afforded, in agreement with earlier observations,[3] tetracyclic dehydrogenation products of types **5**, **6** and **13**–**16**, compound **7c** (containing a hydroxymethylene bridge between its two hetero rings) afforded a mixture of the rearrangement products **9c** and **10c**, and the fragmentation product **8c**.



	n	X: 4	X: 5, 6
b	1	3-OMe	2-OMe
d	1	4-F	3-F
e	2	3-OMe	2-OMe





11d, **13d**, **14d** : Y = OAc ; **12d**, **15d**, **16d** : Y = Cl

† All chiral compounds discussed in the present synopsis are racemic; only one enantiomer is shown.

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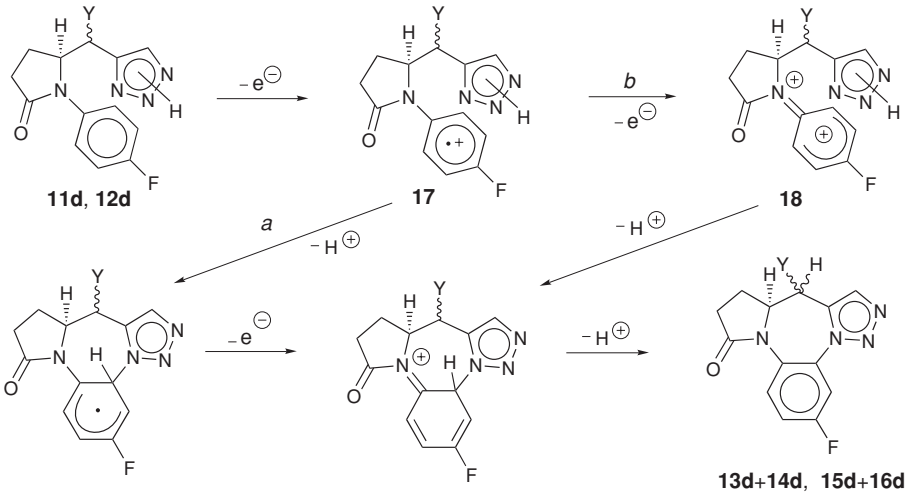
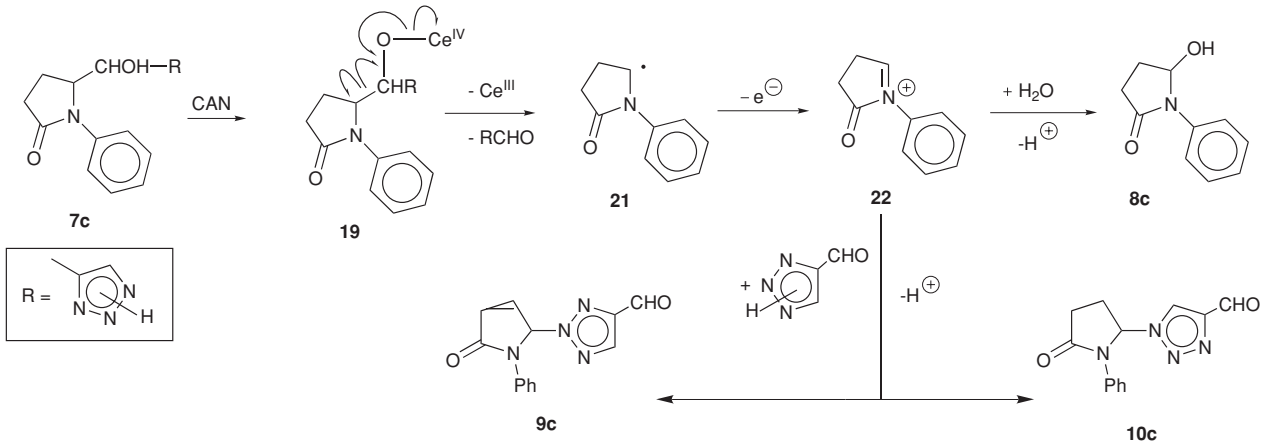


Scheme 1 Alternative mechanisms suggested for the oxidation of compounds **11d** and **12d**. Only one limiting structure, each, is shown for the radical cations **17** and the dications **18**. **11**, **13**, **14** : Y=AcO; **12**, **15**, **16** : Y=Cl



Scheme 2 Mechanism suggested for the formation of the oxidative fragmentation product **8c** and the oxidative rearrangement products **9c** and **10c**.

The dichotomy of the oxidation reaction is believed to be the result of the oxidant attacking the substrates at different sites. Thus, the oxidant is thought to attack substrates **4**, **11d** and **12d** at their *N*-C_6H_4X groups, leading, as shown for compounds **11d** and **12d** in Scheme 1, to tetracyclic dehydrogenation products. On the other hand, compound **7c** is thought to be attacked at the hydroxyl group of the bridge, leading, as shown in Scheme 2, to a mixture of compounds **8c**–**10c**.

Techniques used: flash chromatography, HRMS, IR, ^{1}H- and ^{13}C-NMR

References: 5

Scheme 3. Preparation a) of compounds of type **4** and b) of compounds **7c**, **11d** and **12d**

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3 Le Thanh Giang, J. Fetter, M. Kajtár-Peredy, K. Lempert, F. Bertha, Gy. M. Keserü, G. Czira, *J. Chem. Res. (S)* 2000, 204-205; *J. Chem. Res. (M)* 2000, 0601-0621.