

Synthesis of novel optically active ligands to coordination chemistry and its application in the organic reactions

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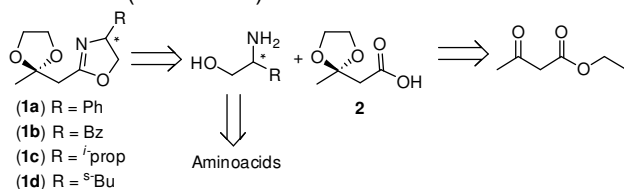
Keywords: catalyst; chiral complexes; lanthanides.

INTRODUCTION

Coordination compounds containing 2-oxazoline unit can be applied as catalysts in organic reactions.¹ Moreover, few studies related to the use of oxazoline-lanthanide complexes in organic reactions are described.² Here we will present the preparation of new ligands containing oxazoline function and the use of these compounds in the preparation of a new class of lanthanides and other coordination compounds. Our initial studies on the application of these catalysts have been made in the epoxide opening reaction.

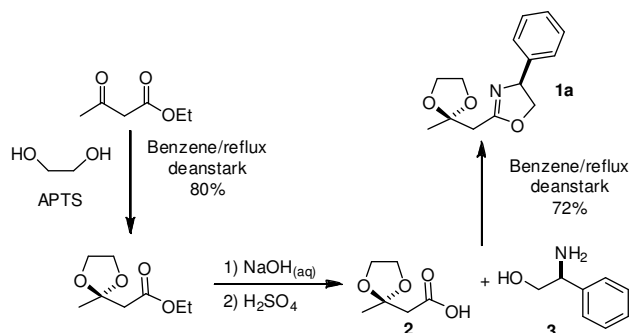
RESULTS AND DISCUSSION

Chiral oxazolines **1a-d** can be prepared by direct reaction between the acid **2**, prepared from ethyl acetoacetate, and an enantiomerically pure amino alcohol in (Scheme 1).



Scheme 1. Retrosynthetic analysis for **1a-d**.

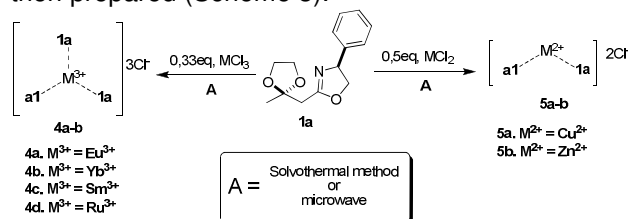
When acid **2** was reacted with phenylglycinol **3**, the enantiomeric pure oxazoline **1a** was obtained in good yield (72%) (Scheme 2).



Scheme 2. Synthesis of ligand **1a**.

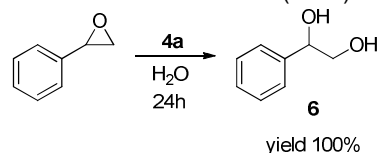
The ligand **1a** was then submitted to the complexation reaction using the following metallic

salts: EuCl₃, YbCl₃, CuCl₂, ZnCl₂, RuCl₃ and SmCl₃. The coordination compounds **4a-d** and **5a-b** were then prepared (Scheme 3).



Scheme 3. Preparations of the complexes **4a-d** and **5a-b**.

The employment of **4a** as a catalyst in the epoxide opening reaction was carried out using styrene oxide (Scheme 4) and chiral GC analysis showed a modest enantiomeric excess of **6** (12%).



Scheme 4. Reaction of styrene oxide using **4a**.

It is important to know that when styrene oxide was left under stirring in water without **4a**, the starting material remained intact.

CONCLUSION

Oxazoline ligands **1a-d** were obtained in good chemical yields and the use of the **1a** in the preparation of complexes **4a-d** and **5a-b** proved to be efficient. Initial studies of the reactivity and enantioselectivity of these complexes in organic reactions are under investigation, and other types of complexes should be prepared following the same methodology.

ACKNOWLEDGEMENTS

PIBIC/PROPESQ; PRONEX-CNPq; FACEPE; INCT-INAMI; CAPES.

REFERENCES

- Evans, D. A.; Miller, S. J.; Lectka, T. *J. Am. Chem. Soc.* **1993**, *115*, 6460.
- (a) Molander, G. A.; Hahn, G. *J. Org. Chem.* **1986**, *51*, 2596; (b) Schaus, S. E.; Jacobsen, E. N. *Org. Lett.* **2000**, *2*, 1001.