



US007282582B2

(12) **United States Patent**
Lindsey et al.

(10) **Patent No.:** US 7,282,582 B2
(45) **Date of Patent:** Oct. 16, 2007

(54) **BORON COMPLEXATION STRATEGY FOR USE IN MANIPULATING 1-ACYLDIPYRRROMETHANES**

(75) Inventors: **Jonathan S. Lindsey**, Raleigh, NC (US); **Kannan Muthukumaran**, Raleigh, NC (US); **Marcin Ptaszek**, Raleigh, NC (US); **H. Z. Syeda Huma**, Raleigh, NC (US)

(73) Assignee: **North Carolina State University**, Raleigh, NC (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **11/559,138**

(22) Filed: **Nov. 13, 2006**

(65) **Prior Publication Data**

US 2007/0088158 A1 Apr. 19, 2007

Related U.S. Application Data

(62) Division of application No. 10/872,321, filed on Jun. 18, 2004, now Pat. No. 7,153,975.

(51) **Int. Cl.**
C07D 487/22 (2006.01)

(52) **U.S. Cl.** **540/145**

(58) **Field of Classification Search** None
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,420,648 B1 7/2002 Lindsey
6,559,374 B2 5/2003 Lindsey et al.
6,603,070 B2 8/2003 Lindsey et al.

6,642,376 B2 11/2003 Lindsey et al.
6,924,375 B2* 8/2005 Lindsey et al. 548/108
2003/0096978 A1 5/2003 Lindsey et al.
2005/0038262 A1 2/2005 Lindsey et al.
2005/0282779 A1 12/2005 Lindsey et al.

OTHER PUBLICATIONS

Zaidi et al., "9-Acylation of 1-Acyldipyrromethanes Containing a Dialkylboron Mask for the Acylpyrrole Motif," *J. Organic Chem.*, vol. 69, No. 24, pp. 8356-8365 (2004).

Muthukumaran et al., "Boron-Complexation Strategy for Use with 1-Acyldipyrromethanes", *The Journal of Organic Chemistry*, 2004, vol. 69 (16), p. 5354-5364.

Zaidi et al., "9-Acylation of 1-Acyldipyrromethanes Containing a Dialkylboron Mask for the α -Acylpyrrole Motif", *The Journal of Organic Chemistry*, 2004, vol. 69 (24), p. 8356-8365.

Gryko et al.; "Parallel synthesis of meso-substituted corroles and meso-substituted [22]pentaphyrins(1.1.1.0.0) from diacyldipyrromethanes" *J. Porphyrins Phthalocyanines* 7 239-248 (2003).

Rao et al.; "Rational Syntheses of Porphyrins Bearing up to Four Different Meso Substituents" *J. Org. Chem.* 2000 65, 7323-7344 (2000).

* cited by examiner

Primary Examiner—Kamal A. Saeed

Assistant Examiner—Sun Jae Y Loewe

(74) *Attorney, Agent, or Firm*—Myers Bigel Sibley & Sajovec, P.A.

(57) **ABSTRACT**

A method of making a metal complex comprises combining a 1-monoacyldipyrromethane with a compound of the formula R^1R^2MX , wherein M is boron, R^1 and R^2 are each independently organic substituents; and X is an anion leaving group; to produce a metal complex of the formula DMR^2 wherein DH is a 1-monoacyldipyrromethane. The methods and complexes are useful for the purification and synthesis of dipyrromethanes and porphyrins.

2 Claims, 1 Drawing Sheet