

Carbohydrate Research Vol. 343, No. 12, 2008

Special Issue

**Selected papers from the 14th European Carbohydrate Symposium, Lübeck,
Germany, Sept. 2007**

Guest Editor: O. Holst

*Research Centre Borstel, Leibnitz-Centre for Medicine and Biosciences, Division of Structural Biochemistry,
Parkallee 1-40, D-23845 Borstel, Germany*

Editor: J. Defaye

Contents

Foreword

p 1887

PERSPECTIVE

Automated carbohydrate synthesis as platform to address fundamental aspects of glycobiology—current status and future challenges pp 1889–1896

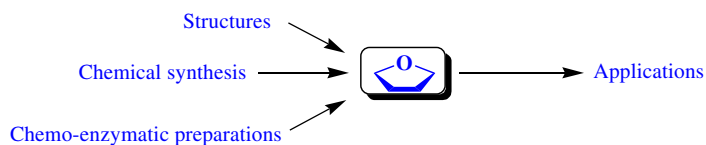
Peter H. Seeberger

The work at the Seeberger laboratory over the past 10 years is reviewed. Advances and shortcomings in automated oligosaccharide synthesis are discussed.

REVIEWS

Recent knowledge and innovations related to hexofuranosides: structure, synthesis and applications pp 1897–1923

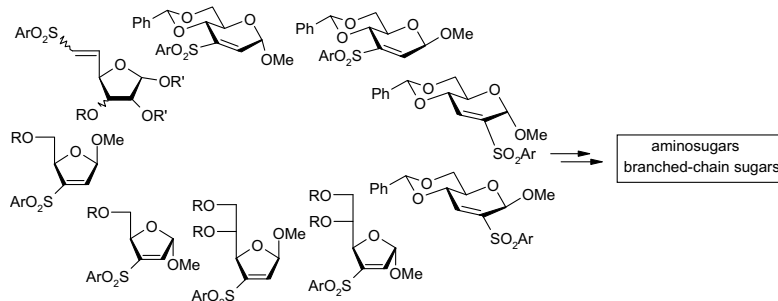
Pauline Peltier, Ronan Euzen, Richard Daniellou,* Caroline Nugier-Chauvin* and Vincent Ferrières*



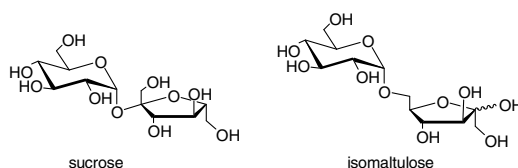
MINIREVIEWS

A vinyl sulfone-modified carbohydrate mediated new route to aminosugars and branched-chain sugars pp 1980–1998

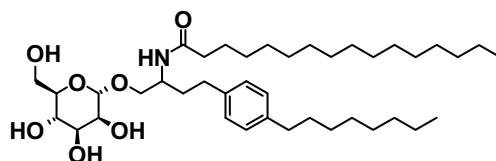
Tanmaya Pathak* and Rahul Bhattacharya

**Recent progress in the synthesis of carbohydrate-based amphiphilic materials: the examples of sucrose and isomaltulose** pp 1999–2009

Yves Queneau,* Stéphane Chambert, Céline Besset and Rouba Cheaib

**Non-reducing end α-mannosylated glycolipids as potent activators for invariant Vα19 TCR-bearing natural killer T cells** pp 2010–2017

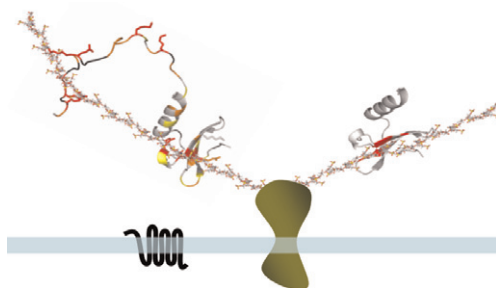
Michio Shimamura



Attempts have been made to find specific antigens for a novel NKT cell subset bearing invariant Vα19-Jα33 TCR α chains (Vα19 NKT cell). Comprehensive examinations revealed substantial antigenic activity in certain α-mannosyl sphingolipids and phosphatidylinositols that were presented by MR1. Structural modification of the sphingosine moiety of α-ManCer improved antigenic activity to enhance either Th1- or Th2-promoting cytokine production by Vα19 NKT cells. Such glycolipids will be useful for developing new therapies as immunomodulators.

Relationships between glycosaminoglycan and receptor binding sites in chemokines—the CXCL12 example pp 2018–2023

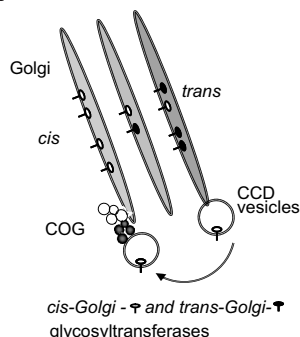
Cédric Laguri, Fernando Arenzana-Seisdedos and Hugues Lortat-Jacob*



Role of the conserved oligomeric Golgi (COG) complex in protein glycosylation

pp 2024–2031

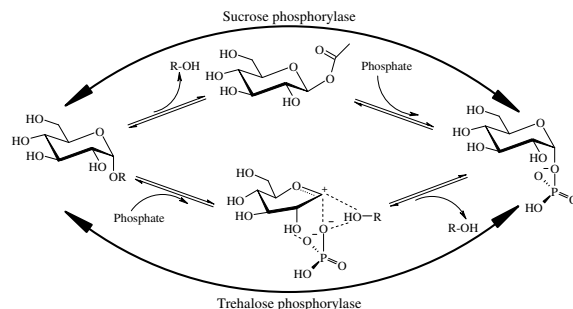
Richard D. Smith and Vladimir V. Lupashin*



Mechanistic differences among retaining disaccharide phosphorylases: insights from kinetic analysis of active site mutants of sucrose phosphorylase and α,α -trehalose phosphorylase

pp 2032–2040

Christiane Goedl, Alexandra Schwarz, Mario Mueller, Lothar Brecker and Bernd Nidetzky*

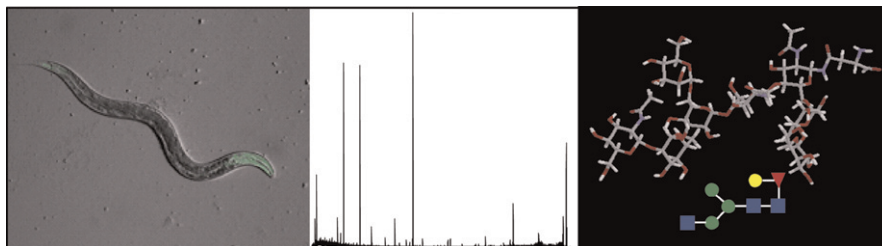


The N-glycosylation pattern of *Caenorhabditis elegans*

pp 2041–2049

Katharina Paschinger,* Martin Gutternigg, Dubravko Rendić and Iain B. H. Wilson

Mass spectrometry of the glycans of the nematode worm *Caenorhabditis elegans* shows the presence of unusual structures. Shown are pictures of a worm expressing a green fluorescent protein under control of a hexosaminidase promoter, an MS–MS spectrum and a model of a novel glycan carrying galactosylated core fucose.



CD33-related sialic-acid-binding immunoglobulin-like lectins in health and disease

pp 2050–2056

Sarah J. McMillan and Paul R. Crocker*

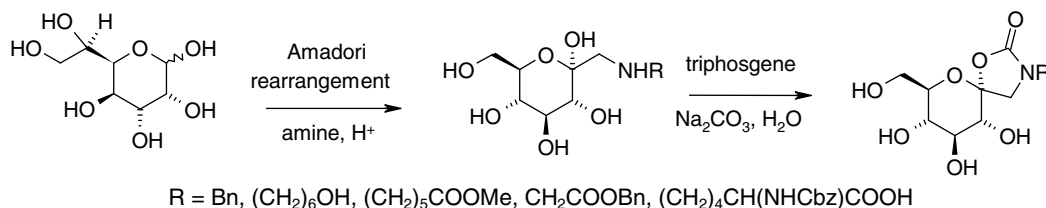
Sialic-acid-binding immunoglobulin-like lectins (Siglecs) are members of the Ig superfamily that bind sialic acids in different linkages in a wide variety of glycoconjugates. These membrane receptors are expressed in a highly specific manner, predominantly within the haematopoietic system. The CD33-related Siglecs represent a distinct subgroup that is undergoing rapid evolution. The structural features of CD33-related Siglecs and the frequent presence of conserved cytoplasmic signalling motifs point to roles in regulating leukocyte functions that are important during inflammatory and immune responses. In this review, we summarise ligand binding preferences and describe recent progress in elucidating the functional roles of CD33-related Siglecs in the immune system. We also discuss the potential for targeting novel therapeutics against these surface receptors.

FULL PAPERS

The Amadori rearrangement as key reaction for the synthesis of neoglycoconjugates

pp 2057–2066

Tanja M. Wrodnigg,* Christiane Kartusch and Carina Illaszewicz



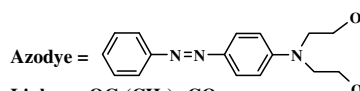
'Naturalization' of textile disperse dyes through glycoconjugation: the case of a bis(2-hydroxyethyl) group containing azo dye

pp 2067–2074

Roberto Bianchini,* Giorgio Catelani,* Riccardo Cecconi, Felicia D'Andrea, Elena Frino, Jalal Isaad and Massimo Rolla

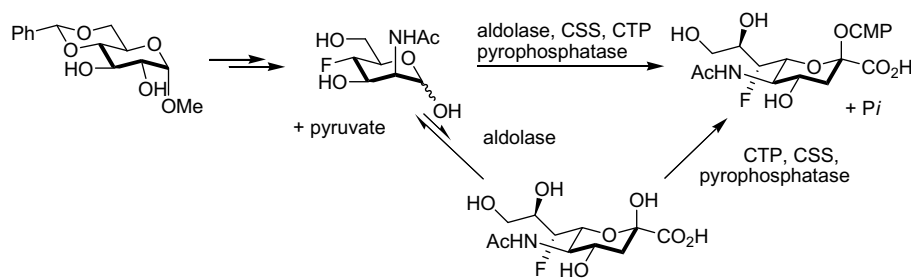


General structure of glycoazodyes (GADs)

Azodye = ; Linker = OC-(CH₂)₂-CO; Sugar = D-Galactos-6-yloxy; 2'-O-Acetylactos-6'-yloxyChemoenzymatic synthesis of CMP-*N*-acetyl-7-fluoro-7-deoxy-neuraminic acid

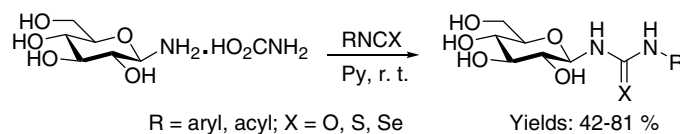
pp 2075–2082

Sina Hartlieb, Almut Günzel, Rita Gerardy-Schahn, Anja K. Münster-Kühnel, Andreas Kirschning and Gerald Dräger*

Assessment of synthetic methods for the preparation of *N*-β-D-glucopyranosyl-*N'*-substituted ureas, -thioureas and related compounds

pp 2083–2093

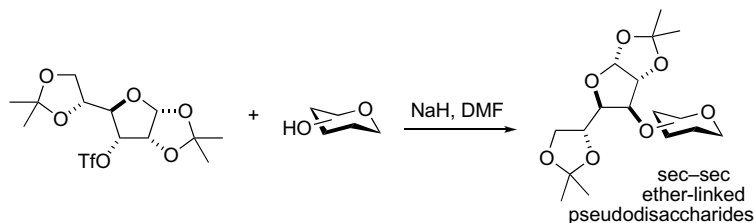
László Somsák,* Nóra Felföldi, Bálint Kónya, Csaba Hüse, Katalin Telepó, Éva Bokor and Katalin Czifrák



Unusual synthesis of carbohydrate *sec-sec* ether-linked pseudodisaccharides

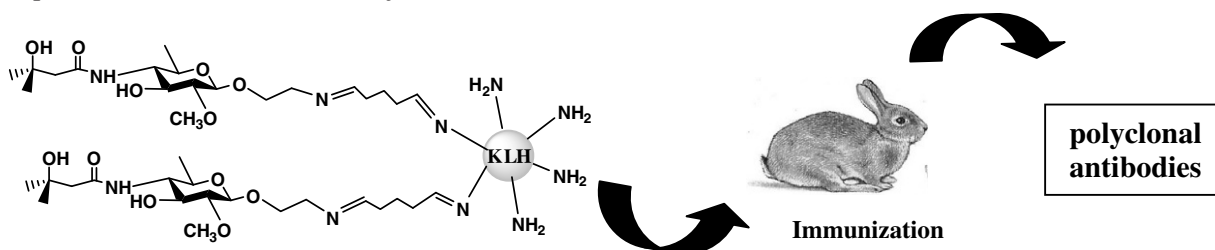
pp 2094–2100

Tashfeen Akhtar, Lars Eriksson and Ian Cumpstey*

**Synthesis of an anthrose derivative and production of polyclonal antibodies for the detection of anthrax spores**

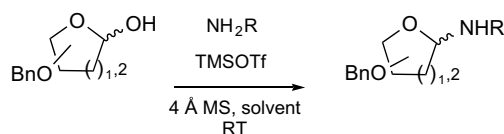
pp 2101–2110

Sandrine G. Y. Dhénin, Vincent Moreau, Nathalie Morel, Marie-Claire Nevers, Hervé Volland, Christophe Créminon and Florence Djedaïni-Pilard*

**One-step synthesis of N-protected glycosylamines from sugar hemiacetals**

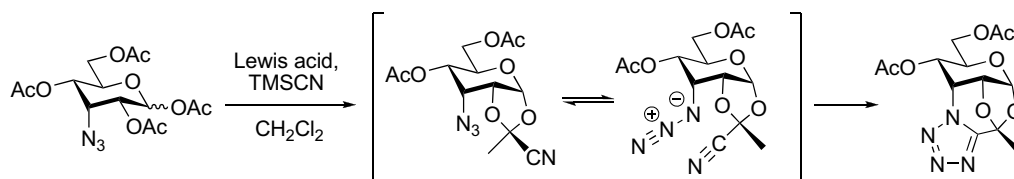
pp 2111–2117

Virginie Liautard, Christelle Pillard, Valérie Desvergnès* and Olivier R. Martin*

**Unexpected formation of complex bridged tetrazoles via intramolecular 1,3-dipolar cycloaddition of 1,2-O-cyanoalkylidene derivatives of 3-azido-3-deoxy-D-allose**

pp 2118–2129

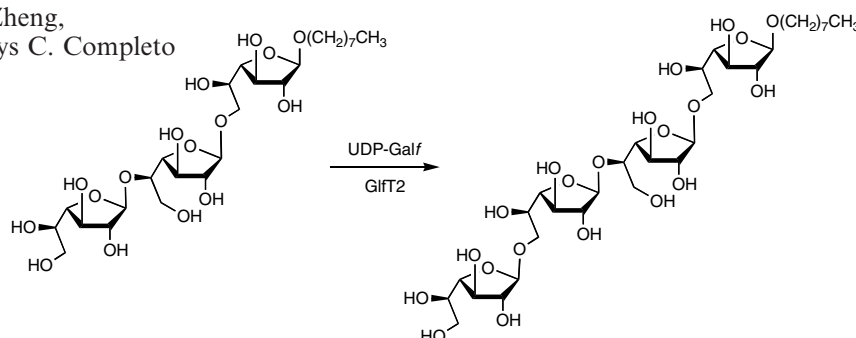
Marco Worch and Valentin Wittmann*



Development of a coupled spectrophotometric assay for GlfT2, a bifunctional mycobacterial galactofuranosyltransferase

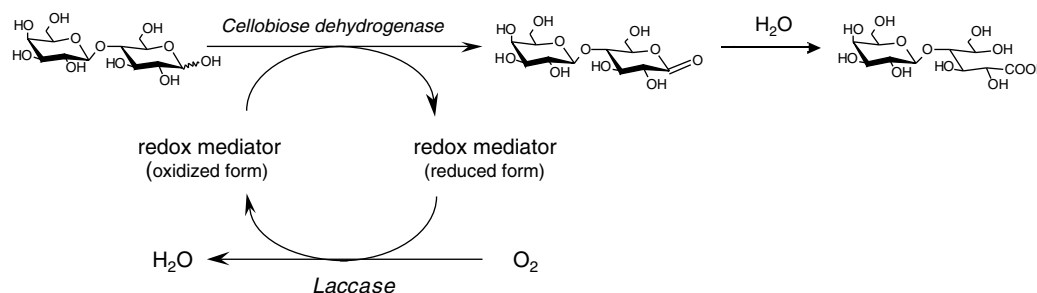
pp 2130–2139

Natisha L. Rose, Ruixiang Blake Zheng,
Jean Pearcey, Ruokun Zhou, Gladys C. Completo
and Todd L. Lowary*

**Production of lactose-free galacto-oligosaccharide mixtures: comparison of two cellobiose dehydrogenases for the selective oxidation of lactose to lactobionic acid**

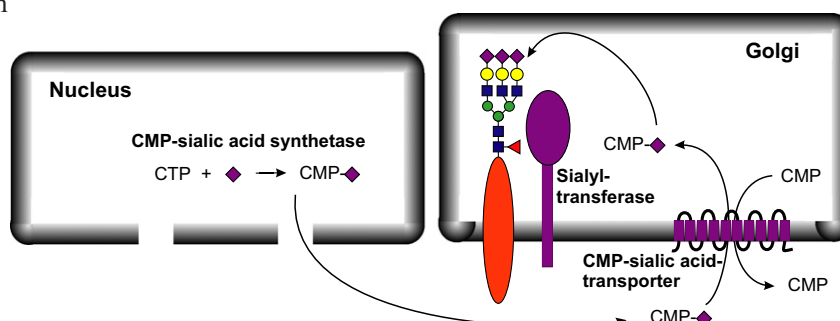
pp 2140–2147

Thomas Maischberger, Thu-Ha Nguyen, Prakit Sukyai, Roman Kittl, Sergio Riva, Roland Ludwig
and Dietmar Haltrich*

**A CMP-sialic acid transporter cloned from *Arabidopsis thaliana***

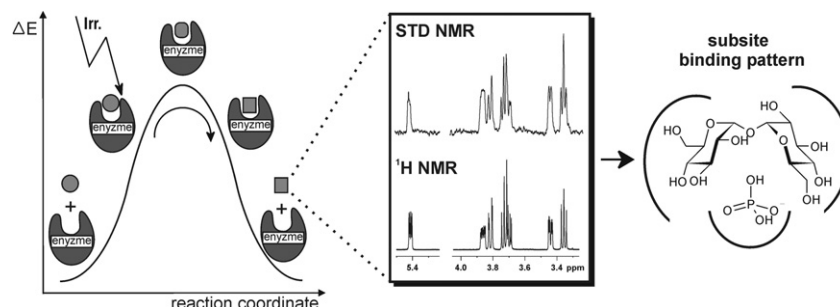
pp 2148–2152

Hans Bakker,* Françoise Routier, Angel Ashikov, Detlef Neumann, Dirk Bosch and
Rita Gerardy-Schahn

**Studying non-covalent enzyme carbohydrate interactions by STD NMR**

pp 2153–2161

Lothar Brecker,* Alexandra Schwarz, Christiane Goedl, Regina Kratzer, Catrin E. Tyl and
Bernd Nidetzky

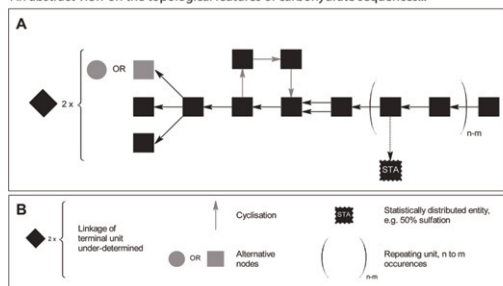


GlycoCT—a unifying sequence format for carbohydrates

pp 2162–2171

S. Herget,* R. Ranzinger, K. Maass and C.-W. v. d. Lieth

An abstract view on the topological features of carbohydrate sequences...

**GlycoCT**

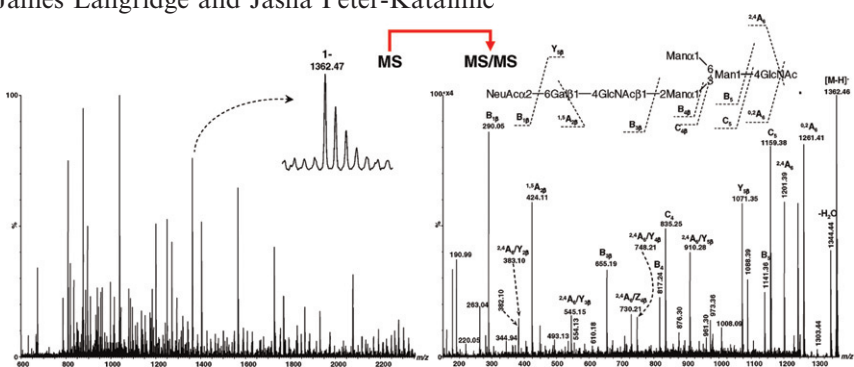
The next generation of carbohydrate structure encoding.

**MALDI-QTOFMS/MS identification of glycoforms from the urine of a CDG patient**

pp 2172–2183

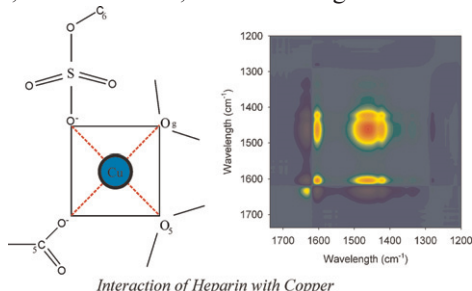
Sergey Y. Vakhruhev, Marten F. Snel, James Langridge and Jasna Peter-Katalinić*

The hybrid Q-TOF instrument fitted with the MALDI ion source has been used for glycoidentification of components in the urine of a CDG patient. MALDI-QTOFMS/MS and MS/MS experiments were combined with computer-assisted compositional assignment, fragment analysis and glycan database search. The rapid structure assignment in clinical glycomics of congenital diseases is presented.

**Site-specific interactions of copper(II) ions with heparin revealed with complementary (SRCD, NMR, FTIR and EPR) spectroscopic techniques**

pp 2184–2193

T. R. Rudd, M. A. Skidmore, S. E. Guimond, M. Guerrini, C. Cosentino, R. Edge, A. Brown, D. T. Clarke, G. Torri, J. E. Turnbull, R. J. Nichols, D. G. Fernig and E. A. Yates*



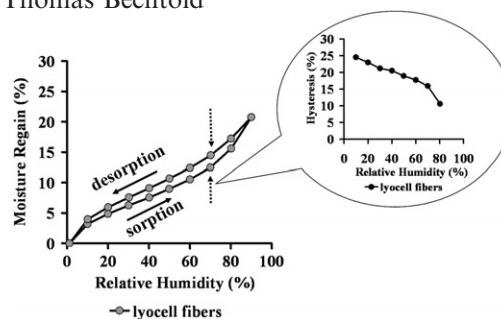
Interaction of Heparin with Copper

**Characterization of cellulosic fibers and fabrics by sorption/desorption**

pp 2194–2199

Barbora Siroka, Michael Noisternig, Ulrich J. Griesser and Thomas Bechtold*

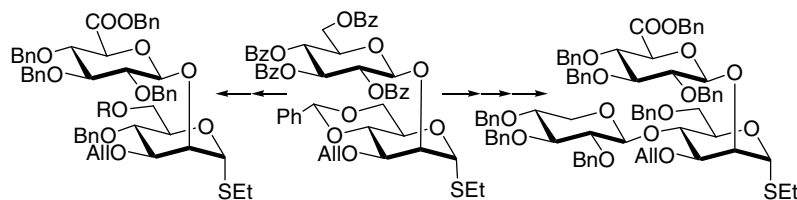
The equilibrated moisture regain values of sorption and desorption isotherms are used for evaluation of hysteresis in regenerated cellulosic substrates.



NOTE

Variant synthetic pathway to glucuronic acid-containing di- and trisaccharide thioglycoside building blocks for continued synthesis of *Cryptococcus neoformans* capsular polysaccharide structures pp 2200–2208

Jan Vesely, Lina Rydner and Stefan Oscarson*



*Corresponding author

i+ Supplementary data available via ScienceDirect

COVER

The graphic represents a molecular dynamics simulation of water density around the disaccharide α -D-Araf-(1 $\rightarrow$ 5)- α -D-Araf-OCH₃, highlighting the interglycosidic linkage. The red clouds represent regions where the probability of finding an oxygen atom is high while the gray clouds are for hydrogen atoms. This work is the result of a collaboration in the Alberta Ingenuity Centre for Carbohydrate Science and Department of Chemistry at the University of Alberta between the groups of Pierre-Nicolas Roy and Todd L. Lowary (Castillo, N.; Roy, P. N.; Lowary, T. L. Manuscript in Preparation).

© 2008 T. L. Lowary. Published by Elsevier Ltd.

Available online at www.sciencedirect.com

Abstracted/Indexed in: Chem. Abstr.: Curr. Contents: Phys., Chem. & Earth Sci. Life Sci. Current Awareness in Bio. Sci. (CABS). Science Citation Index. Full texts are incorporated in CJELSEVIER, a file in the Chemical Journals Online database which is available on STN® International. Also covered in the abstract and citation database SCOPUS®. Full text available on ScienceDirect®



ELSEVIER

ISSN 0008-6215