

An oxido-bridged dinickel(II) complex with L-alanine derived spiro ligand from an unusual mannich aminomethylation

CHEW HEE NG*†, THIAM SEONG CHONG‡,
SIANG GUAN TEOH§ and SEIK WENG NG¶

†Faculty of Engineering and Science, Universiti Tunku Abdul Rahman,
53300 Kuala Lumpur, Malaysia

‡Department of Chemistry, National University of Singapore,
117543 Singapore

§School of Chemistry, Universiti Sains Malaysia, 11800 Penang,
Malaysia

¶Department of Chemistry, University of Malaya, 50603 Kuala Lumpur,
Malaysia

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The crystal structure of a centrosymmetric dinuclear nickel(II) complex, formed from the reaction of bis(L-alaninato)nickel(II) with formaldehyde and methylamine, shows two bridging 2,4,8,10-tetramethyl-5-oxido-5'-carboxylato-2λ⁵,4,8,10-tetraazaspiro[5.5]undec-2-en(234-del)-ylium ligands, L, and two formate ligands; each nickel atom exists in a *trans*-N₂O₄ octahedral geometry with an average (μ-O)–Ni distance of 2.033(1) Å and Ni...Ni distance of 2.894(1) Å. Formation of L implicates an unprecedented deamination step involving activation of both the α-carbon and the α-methyl hydrogen atoms of the L-alaninato moiety.

Keywords: Dinickel(II) complex; L-Alanine; Mannich aminomethylation; Deamination; Crystal structure

1. Introduction

The biological importance of nickel is seen from its presence in six types of metallo-enzymes, namely, ureases, hydrogenases, methyl coenzyme M reductase, carbon monoxide dehydrogenase, acetylcoenzyme A synthase, and nickel superoxide dismutase [1]. Urease, the only nickel-containing metallohydrolase, catalyses the hydrolysis of urea to ammonia and carbon dioxide [2]. The microbial urease from *Klebsiella aerogenes* has been found to contain two nickel(II) ions, which are 3.5 Å apart within

*Corresponding author. Email: ngchi@mail.utar.edu.my