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# A Novel Tridentate [ONS] Binuclear Titanium Complex Bearing Oxo-bridged Macrocyclic Structure for Ethylene Polymerization

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**Abstract:** A novel xanthene-bridged bis(salicylaldiminato) tridentate [ONS] ligand ligated binuclear titanium complex  $Ti^2L$  bearing oxo-bridged macrocyclic structure were synthesized and characterized by  $^1H$  NMR, IR and elemental analysis. This binuclear complex  $Ti^2L$  was also investigated by single-crystal X-ray diffraction, which demonstrated  $C_2$  symmetric structure with each titanium coordinated with six atoms and formed a distorted octahedral configuration. The two titanium centers were also bridged by an oxygen atom to form a relatively stable macrocyclic structure. The binuclear complex exhibited excellent activity up to  $1.99 \times 10^6$  g/molTi·h for ethylene polymerization upon activation with modified methylaluminoxane (MMAO), producing high molecular weight polyethylene with bimodal distribution. The reaction conditions, such as ethylene pressure, Al/Ti molar ratios and reaction temperatures, were found to have great influence on catalytic activity and polymer properties. Compared with the corresponding mononuclear analogue  $TiL$ ,  $Ti^2L$  showed similar catalytic activity towards ethylene polymerization but produced polymer with lower molecular weight and much wider polydispersities (6.74-20.88), suggesting that two different active centers were present in this binuclear complex.

**Keywords:** Binuclear titanium complex; Ethylene polymerization; Salicylaldiminato tridentate ligand; Non-metallocene catalysts

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