Syntheses, structure and near-infrared (NIR) luminescence of Er$_2$, Yb$_2$, ErYb of homodinuclear and heterodinuclear lanthanide(III) complexes based on salen ligand

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Fig. S1 a) The crystal structure of 3, all hydrogen atoms have been omitted for clarity. Selected bond lengths (Å) and angles (°): Yb(1)–O(2a) 2.162(4), Yb(1)–O(3) 2.221(5), Yb(1)–O(1) 2.256(4), Yb(1)–O(4) 2.256(5), Yb(1)–O(1a) 2.300(4), Yb(1)–N(1a) 2.424(5), Yb(1)–N(2a) 2.452(5), Yb(1)–Er(1a) 3.6973(8), Yb(1)–Yb(1a) 3.6973(8), Er(1a)–O(1) 2.300(4), Yb(1a)–O(1) 2.300(4), Er(1a)–O(2) 2.162(4), Yb(1a)–O(2) 2.162(4), Er(1a)–N(1) 2.424(5), Yb(1a)–N(1) 2.424(5), Er(1a)–N(2) 2.452(5), Yb(1a)–N(2) 2.452(5), Yb(1)–O(1)–Er(1a) 108.50(16); b) Perspective view of coordination polyhedron for Yb(III) or Er(III) ion in 3.
Fig. S2 a) Infrared spectrum of complex 1; b) Infrared spectra of complexes 2 and 3.

Fig. S3 Twisted butterfly style forming by two cavity N₂O₂ in complex 1.

Fig. S4 Visible emission spectrum of complex 1 in dichloromethane at room temperature.
Table S1 Infrared spectra for H$_2$salen ligand and complexes 1-3

<table>
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<th>Compounds</th>
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<tr>
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<tr>
<td>2</td>
<td>1642</td>
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