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Retraction of articles

This article reports the retraction of 39 articles published in *Acta Crystallographica Section E* between 2004 and 2009.

After thorough investigation (see Harrison *et al.*, 2010), 39 additional articles are retracted as a result of problems with the data sets or incorrect atom assignments. Full details of all the articles are given in Table 1.

Table 1
Details of articles to be retracted, in order of publication.

Title	Reference	Retracted by	DOI	Refcode
trans-Bis{1-[3-(cyclohexylamino)propyliminomethyl]-2-naphtholato}copper(II) dichloride dihydrate	Zhang (2004)	Journal	10.1107/S1600536804028296	BIPDUA
Bis(4-bromo-2-formylphenolato-κ^2O,O')copper(II)	Sun & Gao (2005)	Author	10.1107/S160053680500187X	FEYSUY
Bis(salicylaldehydo)zinc(II)	Xiong & Liu (2005)	Journal	10.1107/S1600536805010913	GAMDUU
Bis(4-bromo-2-formylphenolato-κ^2O,O')zinc(II)	Chen (2006)	Journal	10.1107/S1600536805040432	SAZCUS
Bis(2-formylphenolato-κ^2O,O')nickel(II)	Li & Chen (2006)	Journal	10.1107/S1600536806012931	IDAZAP
Bis(2-formylphenolato)cobalt(II)	Qiu (2006)	Journal	10.1107/S1600536806015704	GEJDUV
Bis(2-formylphenolato-κ^2O,O')manganese(II)	Wang & Fang (2006)	Journal	10.1107/S1600536806021039	IDOVED
Tetraaqua(1,10-phenanthroline-κ^2N,N')copper(II) naphthalene-1,5-disulfonate dihydrate	Liu *et al.* (2006)	Author	10.1107/S1600536806030637	GENYOO
Tetraaqua(1,10-phenanthroline-κ^2N,N')nickel(II) naphthalene-1,5-disulfonate dihydrate	Liu & Fan (2006)	Author	10.1107/S1600536806035410	KERBEP
{6,6′-Diethoxy-2,2′-[ethane-1,2-diylbis(nitrilomethylidyne)]diphenolato}-trinitratolutetium(III)copper(II)	Sui *et al.* (2006)	Journal	10.1107/S160053680604565X	HESPEP
Bis(2-formylphenolato-κ^2O,O')iron(II)	Yang *et al.* (2007)	Author	10.1107/S1600536807021721	PIFCAJ
2,6-Dimethoxybenzohydrazide	Qadeer *et al.* (2007*a*)	Journal	10.1107/S1600536807022593	PIFHES
2-(2,4-Dichlorophenylsulfanyl)acetohydrazide	Qadeer *et al.* (2007*b*)	Journal	10.1107/S1600536807022891	YIFSOW
{6,6′-Diethoxy-2,2′-[ethane-1,2-diylbis(nitrilomethylidyne)]diphenolato}-trinitratoeuropium(III)zinc(II)	Hu *et al.* (2007)	Author	10.1107/S1600536807031121	WIHKEE
{μ-6,6′-Diethoxy-2,2′-[ethane-1,2-diylbis(nitrilomethylidyne)]diphenolato}-trinitratocerium(III)zinc(II)	Sui, Zhang, Hu & Yin (2007)	Author	10.1107/S1600536807032564	WIHREL
{μ-6,6′-Diethoxy-2,2′-[ethane-1,2-diylbis(nitrilomethylidyne)]diphenolato}-trinitratopraseodymium(III)zinc(II)	Chen *et al.* (2007)	Author	10.1107/S1600536807032540	WIHRIP
{μ-6,6′-Diethoxy-2,2′-[ethane-1,2-diylbis(nitrilomethylidyne)]diphenolato}-trinitratopraseodymium(III)nickel(II)	Sui, Li *et al.* (2007)	Author	10.1107/S1600536807032618	UFACUA
{6,6′-Dimethoxy-2,2′-[ethane-1,2-diylbis(nitrilomethylidyne)]diphenolato-1$\kappa^4O^1,O^{1'},O^6,O^{6'}$:2$\kappa^4O^1,N,N',O^{1'}$}(methanol-1κO)-μ-nitrato-1:2κ^2O:O′-dinitrato-1κ^4O,O'-cerium(III)zinc(II)	Sui, Fang, Hu & Lin (2007)	Author	10.1107/S1600536807033314	UDUYIC
{6,6′-Dimethoxy-2,2′-[ethane-1,2-diylbis(nitrilomethylidyne)]diphenolato}-methanol-μ-nitrato-dinitratosamarium(III)nickel(II)	Sui, Zhang, Hu & Jiang (2007)	Author	10.1107/S1600536807037130	AFECEU
{6,6′-Dimethoxy-2,2′-[ethane-1,2-diylbis(nitrilomethylidyne)]diphenolato}-methanol-μ-nitrato-dinitratopraseodymium(III)zinc(II)	Sui, Fang & Yuan (2007)	Author	10.1107/S1600536807037488	AFICEY
{6,6′-Dimethoxy-2,2′-[ethane-1,2-diylbis(nitrilomethylidyne)]diphenolato}-methanol-μ-nitrato-dinitratolutetium(III)zinc(II)	Sui, Sui *et al.* (2007)	Author	10.1107/S1600536807037737	AFEFOH
catena-Poly[[chloridonickel(II)]-di-μ-chlorido-[chloridonickel(II)]-μ-4,4′-methylenebis(3,5-dimethylpyrazole)-κ^2N^2:$N^{2'}$]	Huang & Chen (2007)	Author	10.1107/S1600536807039384	VIJYOD
{2,2′-[o-Phenylenebis(nitrilomethylidyne)]diphenolato}zinc(II)	Liu *et al.* (2007*a*)	Author	10.1107/S1600536807040640	DIKYUS
trans-Bis(ethylenediamine-κ^2N,N')bis(nitrato-κO)zinc(II)	Liu, Zeng & Chen (2007)	Author	10.1107/S1600536807042390	XIKYEW
[N,N′-(o-Phenylene)bis(picolinamido)-κ^4N,N',N'',N''']cobalt(II)	Liu & Zeng (2007*a*)	Author	10.1107/S1600536807044571	XILFII
[N,N′-(o-Phenylene)dipicolinamide-κ^4N]nickel(II)	Liu & Zeng (2007*b*)	Author	10.1107/S1600536807048386	WINWEW
{2,2′-[o-Phenylenebis(nitrilomethylidyne)]diphenolato}manganese(II)	Liu *et al.* (2007*b*)	Author	10.1107/S1600536807052993	VIQPIV
N-(2-Amino-3-pyridyl)urea monohydrate	Li *et al.* (2007)	Author	10.1107/S1600536807047526	SIMFEA
N-(2-Fluorophenyl)carbamic acid monohydrate	Yang (2007)	Author	10.1107/S1600536807052464	WINMOW
Aqua(dimethylglyoxime-κ^2N,N')(3,5-dinitro-2-oxidobenzoato-κ^2O^1,O^2)-copper(II)	Liu & Wen (2007)	Author	10.1107/S1600536807054244	HIQCAM
μ-Acetato-tri-μ-ferrocenecarboxylatobis[(N,N-dimethylformamide)-copper(II)]	Liu, Lin *et al.* (2007)	Journal	10.1107/S1600536807059041	HIQQEE

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Table 1 (continued)

Title	Reference	Retracted by	DOI	Refcode
{μ-6,6′-Dimethoxy-2,2′-[ethane-1,2-diylbis(nitrilomethylidyne)]diphenolato}-μ-nitrato-dinitratoeuropium(III)zinc(II)	Hu *et al.* (2008)	Author	10.1107/S160053680706151X	MIRPAF
Bis(4-chloro-2-formylphenolato)nickel(II)	Li *et al.* (2008)	Author	10.1107/S1600536807056309	RISTET
{μ-6,6′-Dimethoxy-2,2′-[ethane-1,2-diylbis(nitrilomethylidyne)]diphenolato}-μ-nitrato-dinitratoterbium(III)zinc(II)	Chen *et al.* (2008)	Author	10.1107/S1600536808006958	QIXHIP
Bis(2-ethoxy-6-formylphenolato-κ^2O^1,O^6)nickel(II)	Han (2008)	Journal	10.1107/S160053680800809X	QIXLIT
{μ-6,6′-Dimethoxy-2,2′-[ethane-1,2-diylbis(nitrilomethylidyne)]diphenolato}-μ-nitrato-dinitratoholmium(III)zinc(II)	Xiao, Sui *et al.* (2008)	Author	10.1107/S1600536808013743	BIZTUA
{μ-6,6′-Diethoxy-2,2′-[ethane-1,2-diylbis(nitrilomethylidyne)]diphenolato}-trinitratoholmium(III)nickel(II)	Xiao, Fu *et al.* (2008)	Author	10.1107/S1600536808013755	BIZVAI
Hydrogen-bonding patterns in the cocrystal terephthalic acid–4,4′-bipyridine (2/1)	Wang *et al.* (2009)	Journal	10.1107/S160053680903236X	DUCZEH
{6,6′-Dimethoxy-2,2′-[ethane-1,2-diylbis(nitrilomethylidyne)]diphenolato-1$\kappa^4O^1,O^{1'},O^6,O^{6'}$:2$\kappa^4O^1,N,N',O^{1'}$}(ethanol-1κO)-μ-nitrato-1:2κ^2O:O′-dinitrato-1κ^4O,O′-samarium(III)zinc(II)	Huang *et al.* (2009)	Journal	10.1107/S1600536809033558	YUCWAV

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A new dinuclear Cu^{II}–Lu^{III} complex with a salen-type Schiff base ligand

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Key indicators

Single-crystal X-ray study
T = 296 K
Mean σ(C–C) = 0.011 Å
R factor = 0.049
wR factor = 0.137
Data-to-parameter ratio = 15.8

For details of how these key indicators were automatically derived from the article, see http://journals.iucr.org/e.

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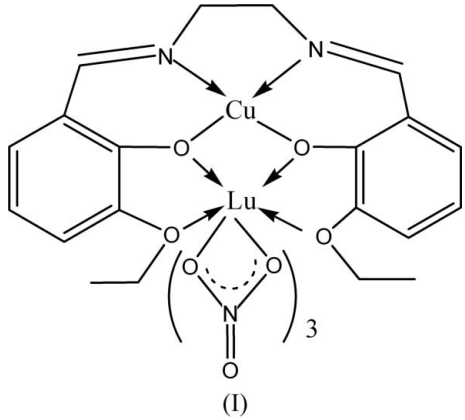
A heteronuclear Cu^{II}–Lu^{III} complex (systematic name: {6,6′-diethoxy-2,2′-[ethane-1,2-diylbis(nitrilomethylidyne)]-diphenolato}trinitratolutetium(III)copper(II)), $[CuLu(C_{20}H_{22}N_2O_4)(NO_3)_3]$, with the hexadentate Schiff base compartmental ligand *N*,*N*′-ethylenebis(3-ethoxysalicylaldiimine) (H_2L), has been synthesized and structurally characterized. The Cu and Lu atoms are doubly bridged by two phenolate O atoms afforded by the Schiff base ligand. No classical intermolecular hydrogen bonds are found. Some weak O···Cu and C—H···O interactions generate a two-dimensional zigzag sheet.

Comment

The potential applications of trivalent lanthanide complexes as contrast agents for magnetic resonance imaging and as stains for fluorescence imaging have prompted considerable interest in the preparation of and magnetic and optical properties of 3*d*–4*f* heterometallic dinuclear complexes (Baggio *et al.*, 2000; Caravan *et al.*, 1999; Edder *et al.*, 2000). Recently, some 3*d*–4*f* heterometallic Schiff base complexes have been synthesized, such as Cu^{II}–Gd^{III}, Ni^{II}–Gd^{III} and Zn^{II}–Ho^{III} heterodinuclear complexes (Brewer *et al.*, 2001; Mohanta *et al.*, 2002; Wong *et al.*, 2002), which exhibit novel magnetic and luminescent properties. However, there have been relatively few studies to date of Cu^{II}–Lu^{III} dinuclear complexes. As part of our investigation into the structure and applications of 3*d*–4*f* heterometallic Schiff base complexes, we report here the synthesis and X-ray crystal structure analysis of the title complex, (I), a new Cu^{II}–Lu^{III} complex with the salen-type Schiff base *N*,*N*′-ethylenebis(3-ethoxysalicylaldiimine) (H_2L).



(I)

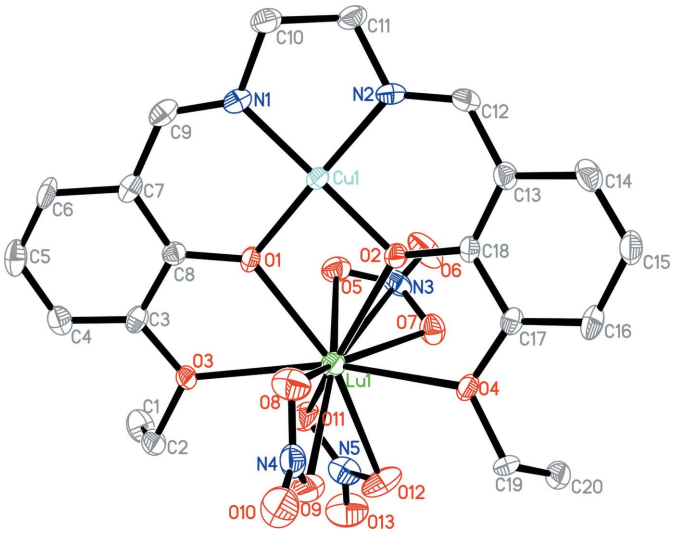


Figure 1
The molecular structure of (I), showing 30% probability displacement ellipsoids. All H atoms have been omitted for clarity.

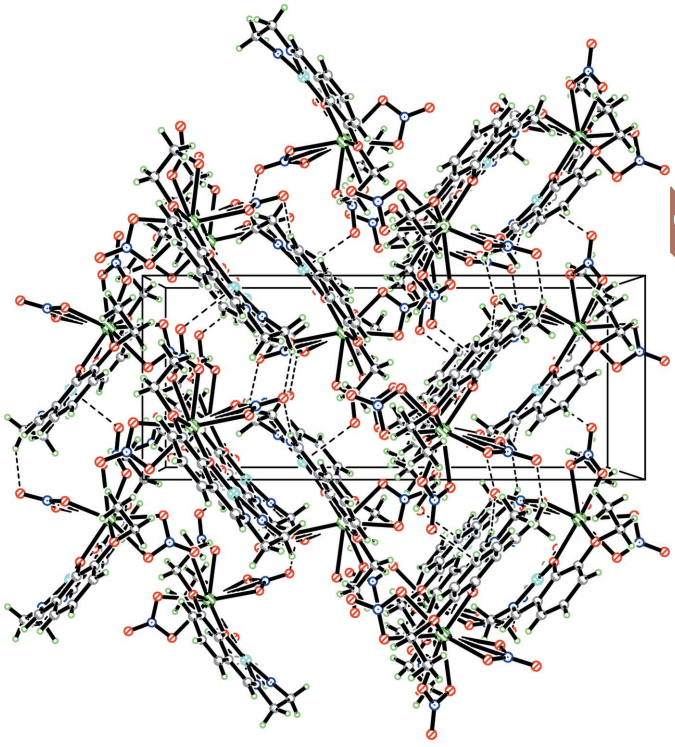


Figure 2
A packing diagram for (I), viewed along the *b* axis. Hydrogen bonds are shown as dashed lines.

Complex (I) crystallizes in the space group $P2_12_12_1$, with the Cu and Lu atoms doubly bridged by two phenolate O atoms provided by a salen-type Schiff base ligand. The inner salen-type cavity is occupied by Cu^{II}, while Lu^{III} is present in the open and larger portion of the dinucleating compartmental Schiff base ligand. The dihedral angle between the mean planes Cu1/O1/O2 and Lu1/O1/O2 is 3.8 (2)°, suggesting that the bridging group is almost planar. The deviations of atoms from the least-squares Cu1/O1/O2/Lu1 plane are −0.0319 (2) Å for Cu, −0.0224 (2) Å for Lu, 0.0267 (3) Å for O1 and 0.0275 (2) Å for O2.

The Lu^{III} centre in (I) has a decacoordination environment of O atoms. In addition to the phenolate ligands, two ethoxy O atoms coordinate to this metal centre. Two O atoms from each of the three nitrates chelate to Lu to complete the decacoordination. The three kinds of Lu—O bond distances are significantly different, the shortest being the Lu—O(phenolate) and the longest being the Lu—O(ethoxy) separations.

The coordination of Cu^{II} is square-planar. The donor centres are alternately above and below the mean N_2O_2 plane, with an average deviation from the plane of 0.0800 (2) Å, while Cu1 is just 0.0402 (3) Å above this square plane.

Adjacent molecules are held together by weak interactions [O13···Cu1 = 3.158 (4) Å, C1—H1*A*···O10^{i}, C1—H1*C*···O11, C9—H9···O6^{ii} and C11—H11*B*···O6^{iii}; symmetry codes: (i) $-1+x, y, z$; (ii) $-x, \frac{1}{2}+y, \frac{1}{2}-z$; (iii) $\frac{1}{2}+x, \frac{1}{2}-y, -z$]. These link the molecules into a two-dimensional zigzag sheet (Fig. 2).

Experimental

H_2L was prepared by the 2:1 condensation of 3-ethoxysalicylaldehyde and ethylenediamine in methanol. Complex (I) was obtained by the treatment of copper(II) acetate monohydrate (0.168 g, 1 mmol) with H_2L (0.356 g, 1 mmol) in methanol solution (100 ml) under reflux for 3 h, and then for another 3 h after the addition of lutetium(III) nitrate hexahydrate (0.469 g, 1 mmol). The reaction mixture was cooled and the resulting precipitate was filtered off, washed with diethyl ether and dried *in vacuo*. Single crystals of (I) suitable for X-ray analysis were obtained by slow evaporation at room temperature of a methanol solution. Analysis calculated for $C_{20}H_{22}CuLuN_5O_{13}$: C 30.84, H 2.85, Cu 8.16, N 8.99, Lu 22.46%; found: C 30.47, H 2.85, Cu 8.17, N 9.03, Lu 22.53%. IR (KBr, cm^{-1}): 1642 (C═N), 1384, 1490 (nitrate).

Crystal data

$[CuLu(C_{20}H_{22}N_2O_4)(NO_3)_3]$	$Z = 4$
$M_r = 778.94$	$D_x = 2.060$ Mg m^{-3}
Orthorhombic, $P2_12_12_1$	Mo $K\alpha$ radiation
$a = 8.5948$ (3) Å	$\mu = 4.83$ mm^{-1}
$b = 13.8147$ (4) Å	$T = 296$ (2) K
$c = 21.1553$ (7) Å	Block, red
$V = 2511.87$ (14) Å^3	0.16 × 0.14 × 0.11 mm

Data collection

Bruker APEXII area-detector diffractometer	18360 measured reflections
φ and ω scans	5736 independent reflections
Absorption correction: multi-scan (*SADABS*; Bruker, 2004)	4572 reflections with $I > 2\sigma(I)$
$T_{min} = 0.478$, $T_{max} = 0.602$	$R_{int} = 0.030$
	$\theta_{max} = 27.5°$

Refinement

Refinement on F^2	$(\Delta/\sigma)_{max} = 0.002$
$R[F^2 > 2\sigma(F^2)] = 0.049$	$\Delta\rho_{max} = 1.53$ e Å^{-3}
$wR(F^2) = 0.137$	$\Delta\rho_{min} = -2.40$ e Å^{-3}
$S = 1.01$	Extinction correction: *APEX2* (Bruker, 2004)
5736 reflections	Extinction coefficient: 0.0025 (4)
364 parameters	Absolute structure: Flack (1983), with 2476 Freidel pairs
H-atom parameters constrained	Flack parameter: 0.156 (16)
$w = 1/[\sigma^2(F_o^2) + (0.0975P)^2]$ where $P = (F_o^2 + 2F_c^2)/3$	

Table 1
Selected geometric parameters (Å, °).

Cu1—N1	1.898 (7)	Lu1—O4	2.605 (5)
Cu1—N2	1.906 (6)	Lu1—O5	2.524 (6)
Cu1—O1	1.901 (5)	Lu1—O7	2.507 (6)
Cu1—O2	1.896 (5)	Lu1—O8	2.508 (7)
Lu1—O1	2.398 (5)	Lu1—O9	2.470 (6)
Lu1—O2	2.355 (5)	Lu1—O11	2.495 (6)
Lu1—O3	2.653 (5)	Lu1—O12	2.578 (6)
N1—Cu1—N2	86.3 (3)	O5—Lu1—O4	114.4 (2)
N1—Cu1—O1	95.6 (3)	O5—Lu1—O12	105.3 (2)
O1—Cu1—N2	172.6 (3)	O7—Lu1—O3	132.38 (18)
O2—Cu1—N1	177.6 (3)	O7—Lu1—O5	49.8 (2)
O2—Cu1—N2	94.1 (2)	O7—Lu1—O8	146.6 (2)
O2—Cu1—O1	84.3 (2)	O7—Lu1—O12	71.9 (2)
O1—Lu1—O3	60.13 (16)	O8—Lu1—O3	80.2 (2)
O1—Lu1—O4	121.95 (17)	O8—Lu1—O4	77.5 (2)
O1—Lu1—O5	69.8 (2)	O8—Lu1—O5	141.1 (2)
O1—Lu1—O7	113.56 (18)	O8—Lu1—O12	113.5 (2)
O1—Lu1—O8	72.7 (2)	O9—Lu1—O3	79.0 (2)
O1—Lu1—O9	114.5 (2)	O9—Lu1—O4	78.3 (2)
O1—Lu1—O11	113.2 (2)	O9—Lu1—O5	162.8 (2)
O1—Lu1—O12	160.9 (2)	O9—Lu1—O7	131.5 (2)
O2—Lu1—O1	64.84 (18)	O9—Lu1—O8	50.3 (2)
O2—Lu1—O3	124.87 (17)	O9—Lu1—O11	94.4 (2)
O2—Lu1—O4	62.09 (17)	O9—Lu1—O12	64.8 (2)
O2—Lu1—O5	74.0 (2)	O11—Lu1—O3	69.67 (18)
O2—Lu1—O7	73.50 (19)	O11—Lu1—O4	122.25 (18)
O2—Lu1—O8	81.0 (2)	O11—Lu1—O5	69.2 (2)
O2—Lu1—O9	123.2 (2)	O11—Lu1—O7	72.1 (2)
O2—Lu1—O11	140.5 (2)	O11—Lu1—O8	137.9 (2)
O2—Lu1—O12	132.8 (2)	O11—Lu1—O12	49.6 (2)
O4—Lu1—O3	155.1 (2)	O12—Lu1—O3	102.2 (2)
O5—Lu1—O3	90.07 (19)	O12—Lu1—O4	77.1 (2)

H atoms were positioned geometrically and treated as riding on their parent atoms, with C—H distances of 0.97 (methylene) and 0.96 Å (methyl), and with $U_{iso}(H) = 1.5U_{eq}(C)$ for methyl H atoms or $1.2U_{eq}(C)$ for other H atoms.

Data collection: *APEX2* (Bruker, 2004); cell refinement: *APEX2*; data reduction: *APEX2*; program(s) used to solve structure: *APEX2*; program(s) used to refine structure: *APEX2*; molecular graphics: *APEX2*; software used to prepare material for publication: *APEX2*.

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