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## Key indicators

Single-crystal X-ray study  
 $T = 292$  K  
Mean  $\sigma(\text{C}-\text{C}) = 0.008$  Å  
 $R$  factor = 0.043  
 $wR$  factor = 0.110  
Data-to-parameter ratio = 16.2For details of how these key indicators were automatically derived from the article, see <http://journals.iucr.org/e>.An orthorhombic polymorph of poly[ $\mu$ -2-amino-benzoato-silver(I)]

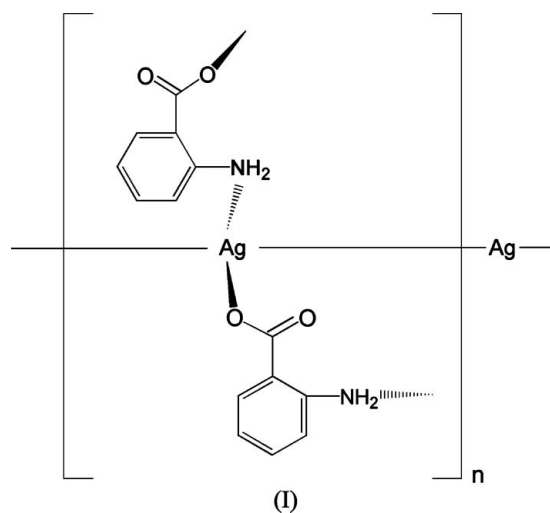
The orthorhombic (space group  $Pna2_1$ ) title compound,  $[\text{Ag}(\text{C}_7\text{H}_6\text{NO}_2)]_n$ , is a polymorph of the known monoclinic ( $P2_1/n$ ) variant of this stoichiometry [Smith, Lynch & Kennard (1999). *Aust. J. Chem.* **52**, 325–327]. In the title compound, the Ag atom shows linear coordination to one O and one N atom [ $\text{Ag}-\text{O} = 2.138$  (5) Å,  $\text{Ag}-\text{N} = 2.153$  (4) Å and  $\text{O}-\text{Ag}-\text{N} = 173.55$  (18)°]. In the monoclinic form, the Ag coordination to two O atoms and one N atom can be described as Y-shaped or distorted trigonal planar. Weak  $\text{Ag}\cdots\text{Ag}$  interactions, aromatic  $\pi$ - $\pi$  stacking and  $\text{N}-\text{H}\cdots\text{O}$  hydrogen-bond interactions help to establish the crystal packing in the title compound.

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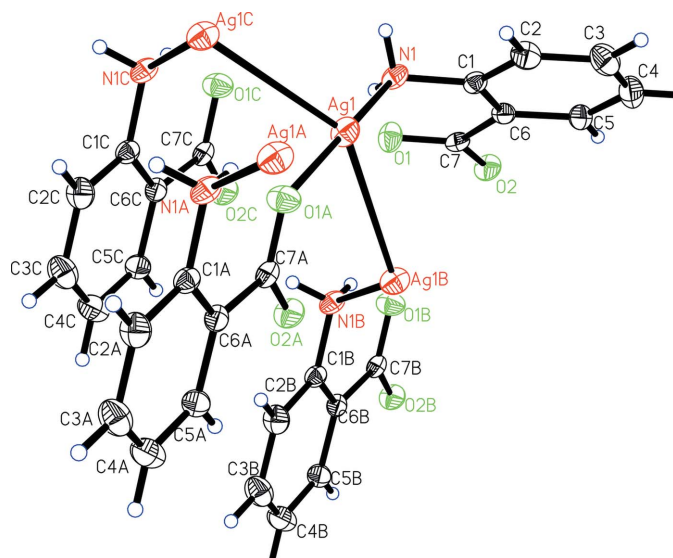
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## Comment

Silver(I) adducts with carboxylate ligands are now an extremely topical area of research and a number of structures have been characterized (Smith *et al.*, 1996, 1998; You & Zhu, 2004; Zhu *et al.*, 2004). The monoclinic structure of silver(I) 2-aminobenzoate,  $[\text{Ag}(\text{C}_7\text{H}_6\text{NO}_2)]$ , was reported by Smith *et al.* (1999), as a zigzag coordination polymer in which the 2-aminobenzoate anion behaves as an  $N,O,O'$ -tridentate ligand. Here we report the synthesis and structure of the title compound, (I) (Fig. 1), an orthorhombic modification of the same stoichiometry.

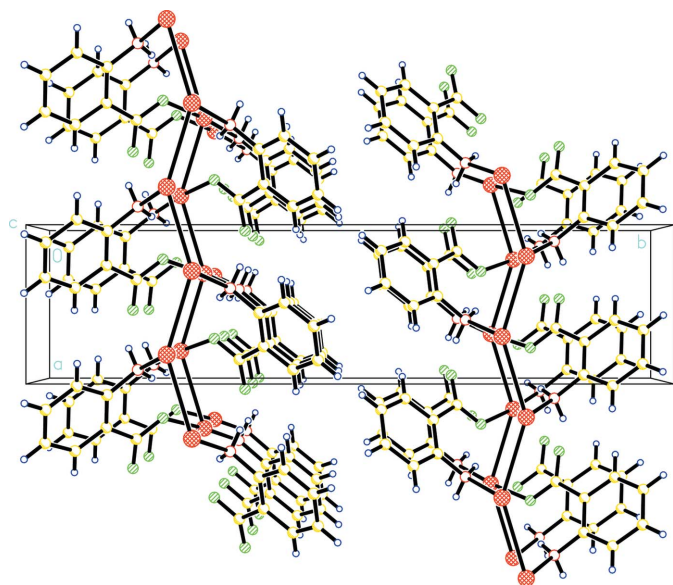


In (I), two silver(I) atoms are linked *via* a 2-aminobenzoate ion, acting as a bridge, extending into a zigzag chain. Each Ag atom is two-coordinated by one N atom and one O atom from two 2-aminobenzoate ligands (Table 1) in a near-linear geometry [ $\text{N}-\text{Ag}-\text{O} = 173.55$  (18)°]. The carboxylate  $\text{C}-\text{O}$  distances in (I) are roughly equal, suggesting delocalization of the negative charge. In the monoclinic form (Smith *et al.*,



**Figure 1**

The structure of (I), expanded to show the Ag coordination, showing 50% probability displacement ellipsoids (arbitrary spheres for the H atoms). Atoms labelled with suffixes A, B and C are at symmetry positions  $(x - \frac{1}{2}, -y + \frac{1}{2}, z)$ ,  $(x - 1, y, z)$ , and  $(x + \frac{1}{2}, -y + \frac{1}{2}, z - 1)$ , respectively.



**Figure 2**

The two-dimensional sheet structure of (I) arising from the Ag...Ag interactions, viewed along  $c$ .

1999), the stereochemistry about each Ag centre is distorted  $\text{AgO}_2\text{N}$  trigonal planar [ $\text{Ag}-\text{O} = 2.223$  (4) and  $2.408$  (4) Å, and  $\text{Ag}-\text{N} = 2.301$  (5) Å], with the three angles subtended at the Ag atom being  $89.8$  (2),  $126.2$  (2) and  $142.9$  (2)°.

The Ag...Ag distance in (I) of  $3.1061$  (4) Å is longer than the equivalent separations of  $2.9128$  (9) and  $2.9887$  (10) Å observed in the monoclinic form; all these are much shorter than the sum of the van der Waals radii of two Ag atoms (3.44 Å).

In (I), the bridging ligand results in zigzag chains propagating in  $[\bar{1}01]$ . The chains are crosslinked *via* weak Ag...Ag interactions into a two-dimensional sheet structure propa-

gating in (010) which is further stabilized by  $\pi-\pi$  stacking and  $\text{N}-\text{H}\cdots\text{O}$  hydrogen-bond interactions (Table 2). The  $\text{Ag}\cdots\text{Ag}\cdots\text{Ag}$  angle of  $146.49$  (3)° in (I) is quite different to that in the monoclinic form [ $130.14$  (4)°], perhaps as a result of the different weak Ag...Ag interactions.

## Experimental

$\text{Ag}_2\text{O}$  (0.1 mmol, 23.2 mg) and 2-aminobenzoic acid (0.2 mmol, 27.4 mg) were dissolved in an aqueous ammonia solution (10 ml), and the resulting solution was stirred for *ca* 15 min to give a clear colorless solution. To this solution was added an acetonitrile solution (5 ml). The mixture was stirred for 1 h, and the resulting colorless solution was kept in the dark at room temperature for 8 d. Colorless block-shaped crystals of (I) formed on slow evaporation of the solvent; these were dried in a vacuum desiccator over anhydrous  $\text{CaCl}_2$  (yield 55%). Elemental analysis calculated for  $\text{C}_7\text{H}_6\text{AgNO}_2$ : C 34.46, H 2.48, N 5.74%; found: C 34.32, H 2.51, N 5.81%.

## Crystal data

$[\text{Ag}(\text{C}_7\text{H}_6\text{NO}_2)]$	$Z = 4$
$M_r = 244.00$	$D_x = 2.293 \text{ Mg m}^{-3}$
Orthorhombic, $Pna2_1$	Mo $K\alpha$ radiation
$a = 5.9486$ (8) Å	$\mu = 2.79 \text{ mm}^{-1}$
$b = 24.227$ (3) Å	$T = 292$ (2) K
$c = 4.9042$ (6) Å	Block, colorless
$V = 706.77$ (16) Å <sup>3</sup>	$0.36 \times 0.30 \times 0.10 \text{ mm}$

## Data collection

Bruker APEX CCD diffractometer	7681 measured reflections
$\omega$ scans	1621 independent reflections
Absorption correction: multi-scan ( <i>SADABS</i> ; Sheldrick, 1996)	1568 reflections with $I > 2\sigma(I)$
$T_{\min} = 0.433$ , $T_{\max} = 0.768$	$R_{\text{int}} = 0.091$
	$\theta_{\max} = 27.5^\circ$

## Refinement

Refinement on $F^2$	$w = 1/[\sigma^2(F_o^2) + (0.0739P)^2 + 0.1709P]$
$R[F^2 > 2\sigma(F^2)] = 0.043$	where $P = (F_o^2 + 2F_c^2)/3$
$wR(F^2) = 0.110$	$(\Delta/\sigma)_{\max} < 0.001$
$S = 1.10$	$\Delta\rho_{\max} = 1.69 \text{ e \AA}^{-3}$
1621 reflections	$\Delta\rho_{\min} = -1.53 \text{ e \AA}^{-3}$
100 parameters	Absolute structure: Flack (1983),
H-atom parameters constrained	713 Friedel pairs
	Flack parameter: 0.01 (7)

**Table 1**

Selected geometric parameters (Å, °).

$\text{Ag1}-\text{O1}^i$	2.138 (5)	$\text{C7}-\text{O1}$	1.264 (7)
$\text{Ag1}-\text{N1}$	2.153 (4)	$\text{C7}-\text{O2}$	1.247 (6)

$\text{O1}^i-\text{Ag1}-\text{N1}$	173.55 (18)
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Symmetry code: (i)  $x - \frac{1}{2}, -y + \frac{1}{2}, z + 1$ .

**Table 2**

Hydrogen-bond geometry (Å, °).

$D-\text{H}\cdots A$	$D-\text{H}$	$\text{H}\cdots A$	$D\cdots A$	$D-\text{H}\cdots A$
$\text{N1}-\text{H1A}\cdots\text{O1}$	0.90	1.86	2.644 (6)	144
$\text{N1}-\text{H1B}\cdots\text{O2}^{ii}$	0.90	2.09	2.917 (6)	152

Symmetry code: (ii)  $x - 1, y, z$ .

All H atoms were placed in geometrically idealized positions (C–H = 0.93 Å and N–H = 0.90 Å) and refined as riding, with  $U_{\text{iso}}(\text{H}) = 1.2U_{\text{eq}}(\text{carrier})$ .

Data collection: *SMART* (Bruker, 2003); cell refinement: *SAINTE* (Bruker, 2003); data reduction: *SAINTE*; program(s) used to solve structure: *SHELXS97* (Sheldrick, 1997a); program(s) used to refine structure: *SHELXL97* (Sheldrick, 1997a); molecular graphics: *SHELXTL* (Sheldrick, 1997b); software used to prepare material for publication: *SHELXL97*.

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