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**Key indicators**

Single-crystal X-ray study  
 T = 293 K  
 Mean  $\sigma(N-C) = 0.010 \text{ \AA}$   
 R factor = 0.029  
 wR factor = 0.070  
 Data-to-parameter ratio = 19.0

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

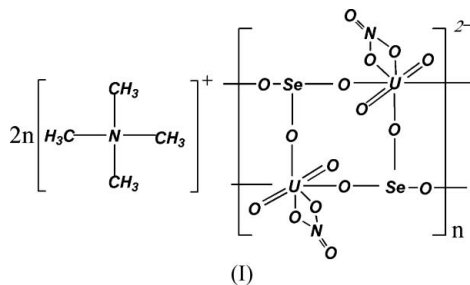
**Poly[tetramethylammonium [nitratouranyl- $\mu_3$ -selenito]]**

The title compound,  $(C_4H_{12}N)[UO_2(NO_3)(SeO_3)]$ , consists of uranyl complex anions and  $[NMe_4]^+$  cations. Both cations and anions display mirror symmetry. Each  $UO_2$  unit is coordinated by three selenite dianions and one nitrate anion with a pentagonal-bipyramidal geometry, forming anionic ladder-like chains with charge-compensating  $[NMe_4]^+$  cations intercalated between the chains.

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**Comment**

Many compounds containing the uranyl ion associated with inorganic oxo-anions such as molybdate, tungstate, vanadate and phosphate have been reported because of their applications in fields of high environmental relevance (Morosin, 1978). However, only four uranyl selenites containing organic groups are included in the Cambridge Structure Database (CSD; Version 5.27; Allen, 2002). We report here the structure of the title polymeric uranyl complex, (I), bridged by selenite anions.



Compound (I) consists of polymeric uranyl  $[(UO_2)(NO_3)(SeO_3)]_n^-$  complex anions and  $[NMe_4]_n^+$  counter-cations. Both cations and anions have mirror symmetry. The polymeric uranyl complex displays a ladder-like structure as shown in Fig. 1. Each  $UO_2$  unit is coordinated by three selenite dianions and one nitrate anion with a pentagonal bipyramidal coordination geometry. The nitrate chelates the  $U^{VI}$  atom with longer  $U-O$  bond distances (Table 1). Each selenite dianion bridges three  $UO_2$  units, forming a polymeric complex chain, which is structurally similar to those found in uranyl sulfate (Doran *et al.*, 2003), uranyl selenate (Krivovichev & Kahlenberg, 2005) and uranyl phosphite (Xu *et al.* 2006). The  $[NMe_4]_n^+$  cations intercalate between the inorganic chains.

**Experimental**

A solution of  $UO_2(NO_3)_2 \cdot 6H_2O$  (0.086 g, 0.17 mmol),  $SeO_2$  (0.162 g, 0.15 mmol) and  $[NMe_4]OH$  (0.02 g, 0.238 mmol) in water (3 ml) was

stirred until completely homogenized. The mixture was poured into a small beaker and left to evaporate. Two months later, needle-like yellow-green crystals of (I) suitable for X-ray analysis had formed.

#### Crystal data

(C<sub>4</sub>H<sub>12</sub>N)[U(NO<sub>3</sub>)O<sub>2</sub>(SeO<sub>3</sub>)]  
*M<sub>r</sub>* = 533.15  
 Monoclinic, C2/m  
*a* = 21.888 (3) Å  
*b* = 6.9501 (8) Å  
*c* = 8.3495 (10) Å  
 $\beta$  = 97.618 (3)°  
*V* = 1259.0 (3) Å<sup>3</sup>

*Z* = 4  
*D<sub>x</sub>* = 2.813 Mg m<sup>-3</sup>  
 Mo *K*α radiation  
 $\mu$  = 15.81 mm<sup>-1</sup>  
*T* = 293 (2) K  
 Needle, yellow-green  
 0.33 × 0.10 × 0.05 mm

#### Data collection

Bruker APEXII CCD  
 diffractometer  
 $\varphi$  and  $\omega$  scans  
 Absorption correction: multi-scan  
 (SADABS; Sheldrick, 2004)  
*T<sub>min</sub>* = 0.178, *T<sub>max</sub>* = 0.454

5627 measured reflections  
 1669 independent reflections  
 1466 reflections with *I* > 2σ(*I*)  
*R<sub>int</sub>* = 0.051  
 $\theta_{\max}$  = 28.3°

#### Refinement

Refinement on *F*<sup>2</sup>  
*R* [*F*<sup>2</sup> > 2σ(*F*<sup>2</sup>)] = 0.029  
*wR* (*F*<sup>2</sup>) = 0.070  
*S* = 1.10  
 1669 reflections  
 88 parameters

H-atom parameters constrained  
 $w = 1/[\sigma^2(F_o^2) + (0.0329P)^2]$   
 where  $P = (F_o^2 + 2F_c^2)/3$   
 $(\Delta\sigma)_{\max} < 0.001$   
 $\Delta\rho_{\max} = 1.61 \text{ e } \text{Å}^{-3}$   
 $\Delta\rho_{\min} = -2.19 \text{ e } \text{Å}^{-3}$

**Table 1**

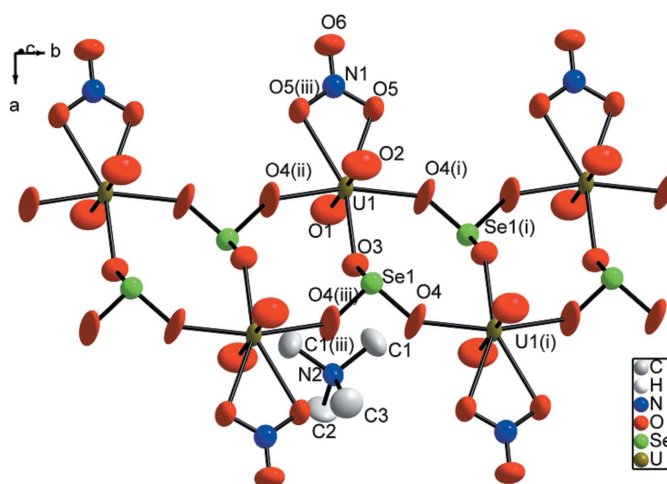
Selected bond lengths (Å).

U1—O2	1.754 (7)	U1—O5	2.535 (4)
U1—O1	1.755 (7)	Se1—O4	1.642 (5)
U1—O4 <sup>i</sup>	2.261 (5)	Se1—O3	1.669 (5)
U1—O3	2.289 (5)		

Symmetry codes: (i)  $-x + \frac{1}{2}, -y + \frac{1}{2}, -z + 1$ ; (ii)  $-x + \frac{1}{2}, y - \frac{1}{2}, -z + 1$ ; (iii)  $x, -y, z$ .

Methyl H atoms were placed in geometrically idealized positions and constrained to ride on their parent atoms, with C—H = 0.96 Å and *U<sub>iso</sub>*(H) = 1.5*U<sub>eq</sub>*(C). The highest peak is located 1.37 Å from atom U1 and the deepest hole 0.87 Å from U1.

Data collection: SMART (Bruker, 2004); cell refinement: SAINT (Bruker, 2004); data reduction: SAINT; program(s) used to solve structure: SHELXS97 (Sheldrick, 1997); program(s) used to refine structure: SHELXL97 (Sheldrick, 1997); molecular graphics:



**Figure 1**

Part of the polymeric structure of (I), shown with 50% probability displacement ellipsoids. H atoms have been removed for clarity. [Symmetry codes: (i)  $\frac{1}{2} - x, \frac{1}{2} - y, 1 - z$ ; (ii)  $\frac{1}{2} - x, -\frac{1}{2} + y, 1 - z$ ; (iii)  $x, -y, z$ .]

DIAMOND (Brandenburg, 1999); software used to prepare material for publication: SHELXL97.

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