[MS24-P14] Crystal structure studies of new strontium dicarboxylates.

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Compounds such as Metal-Organic Frameworks (MOFs) currently draw the attention of a wide group of scientists from all over the world. MOFs are chemical compounds formed by metal center or metal clusters connected by rigid organic ligands, forming porous three dimensional structures [1]. In recent years an increased amount of research is connected with potential practical applications of these compounds, such as gas sorbents, gas separators, catalysts or gas storage [2-4].

The related MOF salts of dicarboxylic acids and alkali and rare earth metals have been less studied so far, due to difficulties with controlling the obtained structures and the many possible coordination numbers of these elements [5]. Although the Cambridge Structural Database contains compounds formed by Li, Na, K, Rb, Cs, Mg and Ca, there are only a few formed by Ba and Sr [6].

During our recent investigations, a group of previously unreported strontium
dicarboxylates have been obtained. Their structural properties have been compared with those for barium compounds, reported by us earlier [7].

This group of new strontium dicarboxylates includes six structures formed by dicarboxylic acids with carbon chains of different lengths [CnH2n(COOH)2; $3 \leq n \leq 10$]. Structures have been solved using powder and single crystal diffraction methods. The obtained compounds crystallize in various crystal systems from triclinic to orthorhombic and exhibit broad structural diversity – from isolated layers, formed by strips of edge-shared coordination polyhedral connected by acid molecules, to isolated polyhedral bridged by dicarboxylic acids forming 3-dimensional networks.

List of investigated compounds; a, b, c, a, b, g, SG:

1).Strontium glutarate pentahydrate: 7.143(5), 7.274(5), 11.323(5), 100.098(5), 98.184(5), 90.415(5), P-1

2).Strontium adipinate: 4.4248(9), 9.9786(17), 4.1841(8), 97.957(17), 97.03(2), 97.061(16), P-1

3).Strontium pimelate: 8.3868(16), 24.661(4), 4.7883(12), 90.0, 114.56(2), 90.0, C2/m

4).Strontium suberate: 6.482(2), 12.490(4), 5.713(3), 102.23(4), 93.67(6), 92.21(4), P-1

5).Strontium azelate: 8.475(5), 8.841(5), 28.051(5), 90.0, 90.0, 90.0, Ibam

6).Strontium dodecanedioate hemihydrate: 36.041(12), 9.371(3), 7.931(3), 90.0, 90.0, 90.0, Ccca

Crystal data for the investigated compounds have been deposited in CSD, with reference numbers: 936122, 936125, 936126, 936132, 936133 and 940007.

[1] Janiak Ch., Dalton Trans., 2003, 14, 2781-2804

[2] Mueller U., Schubert M., Teich F., Puetter H., Schierle-Arndt K. and Pastre J., J. Mater. Chem.,16, 2006, 626–636

[3] Mesbah A., Aranda L., Steinmetz J., Rocca E., François M., Solid State Sci. 13, 2011, 1438-1442

[4] Borkowski L.A., Cahill Ch.L, Cryst. Growth Des. 6 (10), 2006, 2241

[5] K. M. Fromm, Coord. Chem. Rev., 2008, 252, 856- 885

[6] Cambridge Structural Database, ver. 2011

[7] M. Grzesiak, W. Nitek, A. Rafalska-Łasocha, and W. Łasocha, Z. Kristallogr., 2012, 9, 629-634

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