MS51-P3 Disulfide complexes: their interaction with silver(I) and copper(II)

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Bisisonicotinate disulphide (isoDiS, Figure 1) was widely used in our research group for Au(111) surface pre-treatment in combination with antibacterial complexes[1, 2]. In order to increase our knowledge of the interactions taking place on the surface, crystallographic studies were performed using the metal ions that were coated on the surface during the above-mentioned studies. These ions are silver(I) nitrate and copper(II) nitrate, both have interesting antibacterial properties, but can interact with the sulphur atoms taking the place of the gold surface. Two similar ligands were also taken into account in order to look for a better alternative, thus improving the quality of the developed materials.

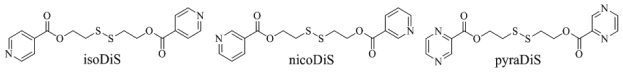

Figure 1. the three different ligands.

Keywords: coordination chemistry, biomaterials

MS51-P4 Chemical composition range and flux crystal growth of $Ca_{2-x}Li_{2x}GeO_4$ solid solutions

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The present studies included: solid state synthesis of $Ca_{2-x}Li_{2x}GeO_4$ where 2x varied from 0 to 2; crystal growth from different solutions with Ca_2GeO_4 concentration in the range from 8 to 40 wt. %; X-ray phase analysis for determining the primary crystallizing phase and its cell parameters; elemental analysis of the obtained crystals.

A series of $Ca_{2-x}Li_{2x}GeO_4$ solid solutions with $0<2x<2$, were synthesized by the classical solid state method. X-ray analysis revealed that for $0<2x<0.6$ only $Ca_{2-x}Li_{2x}GeO_4$ solid solutions of Ca_2GeO_4 structure crystallized. The cell parameters of this phase linearly decreased upon increasing the lithium concentration, which means that the solutions are in accordance with the Vegard's law. For $2x>0.6$ the specimens contained two phases: (i) $Ca_{2-x}Li_{2x}GeO_4$ with maximum lithium concentration approximately equal to that for $2x = 0.6$ and minimum values of the cell parameters and (ii) Li_2CaGeO_4.

Both Li_2CaGeO_4 and Ca_2GeO_4 doped with chromium are promising laser materials with Cr^{4+} emission in the 1.1 – 1.6 μm range. From this point of view it was important to find suitable conditions for the crystal growth from Li_2CaGeO_4 and from $Ca_{2-x}Li_{2x}GeO_4$ solid solutions in order to obtain good-quality crystals with the required dimensions.

High temperature solutions were used for Li_2CaGeO_4 and $Ca_{2-x}Li_{2x}GeO_4$ crystal growth by spontaneous crystallization. Li_2CaGeO_4 crystals were grown in the concentration range 8-26 wt. % Ca_2GeO_4 in the temperature range 830-980 °C. Crystals with chemical compositions different from those of the $Ca_{2-x}Li_{2x}GeO_4$ solid solutions were grown in the concentration range 26-40 wt % Ca_2GeO_4 in the temperature range 980-1090 °C.

The cell volumes calculated on the basis of the XRD measurements and the lithium concentrations obtained by ICP-OES analysis for some crystals were plotted on the linear dependence between the cell volumes and the lithium concentrations of the $Ca_{2-x}Li_{2x}GeO_4$ solid solutions obtained after solid state synthesis (Fig). As can be seen, all crystal specimens grown from the high temperature system are $Ca_{2-x}Li_{2x}GeO_4$ solid solutions with cell volumes and lithium concentrations similar to those obtained by solid state synthesis.

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