known: $Gly_3{\cdot}ZnCl_2$ (space group $Pbn2_1$), $Gly_2{\cdot}ZnCl_2 \cdot 2H_2O$ (space group $C2/c$), $Gly{\cdot}ZnCl_2 \cdot H_2O$ (space group $P2_1/a$) and $Gly{\cdot}ZnCl_2$ (space group $P2_1$), (gly = abbreviation of glycine) [1-5]. In recent studies crystals of the polar compound $Gly_3{\cdot}ZnCl_2$ turned out to be attractive optical materials, that show both, phase-matchable second harmonic generation (SHG) and efficient frequency conversion by stimulated Raman scattering (SRS) with a rather large Raman shift of about 3000 cm^{-1} [2, 6]. Motivated by these results we focused our interest on the further glycine compounds listed above. In the present contribution we report on crystal growth of $Gly_2{\cdot}ZnCl_2 \cdot 2H_2O$ and of $Gly{\cdot}ZnCl_2$, together with their basic linear optical properties. Large single crystals of $Gly_2{\cdot}ZnCl_2 \cdot 2H_2O$ were grown from aqueous solution at 38°C by controlled slow evaporation of the solvent. Within three months crystals with dimensions up to 5 x 4 x 3 cm were obtained. Crystal growth of $Gly{\cdot}ZnCl_2$ was performed at 50°C and resulted in crystals of dimensions up to 2.5 x 1 x 0.7 cm after a growth period of six months. Refractive indices and their dispersion were determined by the prism method in the wavelength range of 0.365 – 1.083 μm. These results establish the essential prerequisites for further nonlinear optical investigations. In the centrosymmetric crystals of $Gly_2{\cdot}ZnCl_2 \cdot 2H_2O$ SRS will be unaffected by $\chi^{(2)}$-based nonlinear optical processes such as SHG and sum frequency generation (SFG), while the polar crystals of $Gly{\cdot}ZnCl_2$ are expected to allow the study of both, SHG and cascaded $\chi^{(2)} + \chi^{(3)}$ nonlinear processes.

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Synthesis and structural properties of ZnO films grown by spray pyrolysis of zinc acetate solution.

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Crystalline ZnO films have a wide variety of applications in the manufacturing of devices such as gas sensors, flat panel displays, transparent electrode materials, solar cells, electroluminescent diodes, etc. The films used have a range of crystal structures and morphologies, and many different methods such as sputtering[1], vacuum evaporation[2] thermal oxidation of Zn films, atomic layer epitaxy and spray pyrolysis. This last technique can be distinguished from the others due to its simplicity, low cost and efficiency, and it provides a powerful tool for creating diverse film structures (from the point of view of grain habits and their associations) with significant differences in morphology, by varying the of pyrolysis conditions.
The morphology and some principal details of the crystallographic grain structure of zinc oxide thin (50–300 nm) films obtained from acetate $Zn(CH_3CO_2).2H_2O$ solution by spray pyrolysis deposition were studied using X-ray diffraction (XRD), extreme high-resolution scanning electron microscopy (XHR SEM) and Transmission Electron microscopy (TEM) methods. Direct correlation between the pyrolysis temperature and several fundamental nanoscale grain shapes and crystallographic features successively replacing each other with *T*pyr was shown.
The X ray diffraction patterns of the films were recorded using a diffractometer with monochromatic Cu K radiation. XRD and TEM results show that these nanoparticles are composed of ZnO with hexagonal structure The parameters of the hexagonal elementary cell are as follows: a = 3.2539(1) Å, c = 5.2098(3) Å, c/a = 1.6011, V = 47.77 $Å^3$. The microstructure of the film was studied with the electron microscope. From these studies it was observed that the orientation of the grains was uniform and the crystallites were very small in size. The morphology qualitatively remained the same and variation in film thickness

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Effects on the physical properties of cation substitution in (La, Sr) CoO_3 perovskite system.

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Cobaltites with general formula $Ln_{1-x}M_xCoO_3$ (Ln is a rare earth element and M is a divalent alkali earth element) have received recently considerable interest due to their potential technological applications. Several studies have been reported on strontium doped $LaCoO_3$ compounds because of its complex phase diagram. At low Sr doping a spin glass (SG) and/or cluster glass (CG) behavior is observed at low temperature, whereas larger Sr doping leads to ferromagnetic ordering. In this work, we present the effects of both (La,Sr)-site and Co-site substitutions on the physical properties in the $(La,Sr)CoO_3$ powder system. Our samples have been elaborated using the solid state reaction method at high temperatures. The Rietveld refinements of the X-ray diffraction patterns recorded at room temperature show that our compounds are single phase and crystallize in the rhombohedral structure with $R\bar{3}c$ space group. The zero field cooled (ZFC) and field cooled (FC) magnetization curves at 50mT show thermomagnetic irreversibility. The magnetic phase at low temperature is found to be correlated to the Co^{3+}/Co^{4+} ratio as well as the A-site average ionic radius. The magnetic entropy change, $|\Delta S_M|$, as a function of temperature and magnetic applied field has been determined from the isothermal magnetization measurements using the Maxwell relations.