For example, lincomycin and roxithromycin exist in at least 3 modifications - 2 crystalline and 1 amorphous, which differ in density values and the nature of the data of differential scanning calorimetry (DSC). The amorphous form of lincomycin during storage in the air turns into a crystalline modification, remaining stable in low humidity (storage in a desiccator).

Most substances, including antibiotics, are characterized by endothermic effects - processes with heat absorption that characterize the structural and phase transformations of substances, so the next stage of research was to study the nature of thermal transformations of lincomycin and roxithromycin.

According to the series of samples of roxithromycin for the original sample we also register one pronounced endothermic effect at 122° C. The DSC curve for an amorphous antibiotic sample and a sample isolated from the ether is of the same type, with structural transformations occurring in two stages and are accompanied by endothermic effects. For the amorphous sample of roxithromycin, the values of the maxima at 94.2° C are 113.4° C, and for the sample obtained from the ether, the values of the maxima are observed at 95° C and 11.7° C.

Despite the similarity of the thermal effects of samples of roxithromycin obtained from the ether (crystalline form) and *dimethylformamide* (DMFA) (amorphous form), the shift of the maximum effect relative to the high-temperature region indicates more stable structure of the sample of roxithromycin isolated from the ether.

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MECHANISM OF NANOPARTICLE INCORPORATION INTO THE SALT CRYSTAL

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The mechanism of incapsulation of aqueous CdTe/CdS quantum dots (QDs) in salt crystals of KBr is discussed. CdTe/CdS QDs in water as dopant of KBr monocrystals were used. The synthesis of CdTe/CdS QDs was based on the interaction of cadmium thioglycolate and hydrogen telluride (H_2Te) in alkaline medium followed by heat treatment of the formed clusters. For incorporation into the matrix, colloidal solutions of negatively charged CdTe/CdS QDs have been synthesized. Crystals of KBr:CdTe/CdS composite were grown by slowly evaporating the solvent from a mixture of a saturated aqueous solution of salt and colloid of nanoparticles under ambient conditions. To avoid energy transfer between neighboring QDs their concentration in the parental solution was kept relatively low. Parental solutions were stored for few days at the room condition. The crystals of salt: QDs composite were isolated from the parental solution, rinsed with acetone and dried.

Embedding of the nanocrystals in the bulk ionic crystals produces materials with density lower than that for matrix itself. This fact is usually omitted in the works of other authors. To evaluate density difference between composite and host materials we grew both of them in similar conditions and determined the density as mass to volume ratio. For cubic samples volume was determined by two approaches – calculation from the linear dimensions of the crystals and/or by fluid displacement method. For the samples of irregular shape only second method was used. According to the data from our experiments the densities of composites are almost 10% less than the density of a pure salt crystal. These results hint, that incorporation of the nanoparticles occurs alongside with the formation of pores (voids) in the composite crystal.

Previous works report that QDs can serve as crystallization centers for the composite. According to this mechanism, a number of crystallization centers should be equal to the number of QDs in the parental solution, and growth of large monocrystal is unlikely. Actually, only up to 4-8 crystals form in the growth solution under typical conditions of synthesis via slow solvent evaporation. This allows us to assume that crystallization centers are still spontaneously formed by the pure salt. Additionally, high ionic strength of the parental solution makes formation of floccules of nanocrystals more favorable. These floccules are attracted to the positively charged surface, cling to it and then captured inside the crystalline volume.

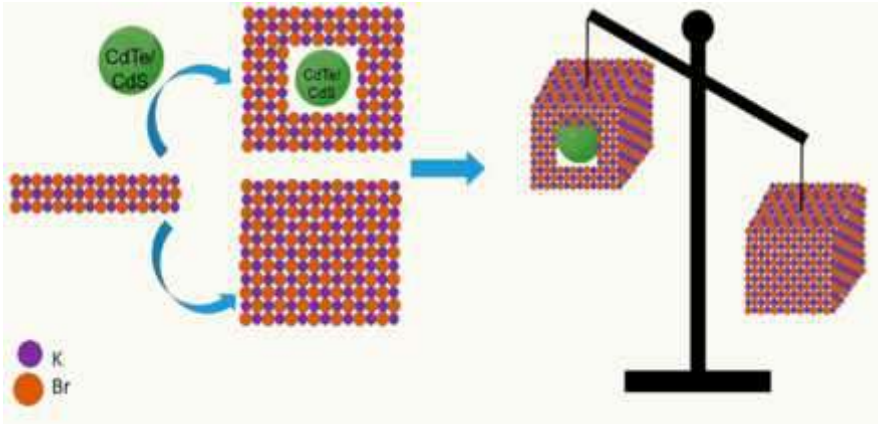

Fig. Scheme of salt and salt:QDs composite crystal growth: 1 - center of crystallization, 2 - incorporation of nanoparticles into the crystal (violet – K^+cations, red – Br^- anions and green – CdTe/CdS nanoparticles (to scale), 3 – comparison of salt and composite crystal density.

In this research work, we suggest, that QDs are not closely packed into the composite crystal so some pores are formed and this causes the decrease of the density of KBr:CdTe/CdS composite comparing to the pure salt crystal.

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SYNTHESIS AND FLUORESCENCE SPECTRUM OF 9-(4-PYRAZOLYL) DECAHYDROACRIDINDIONES-1,8

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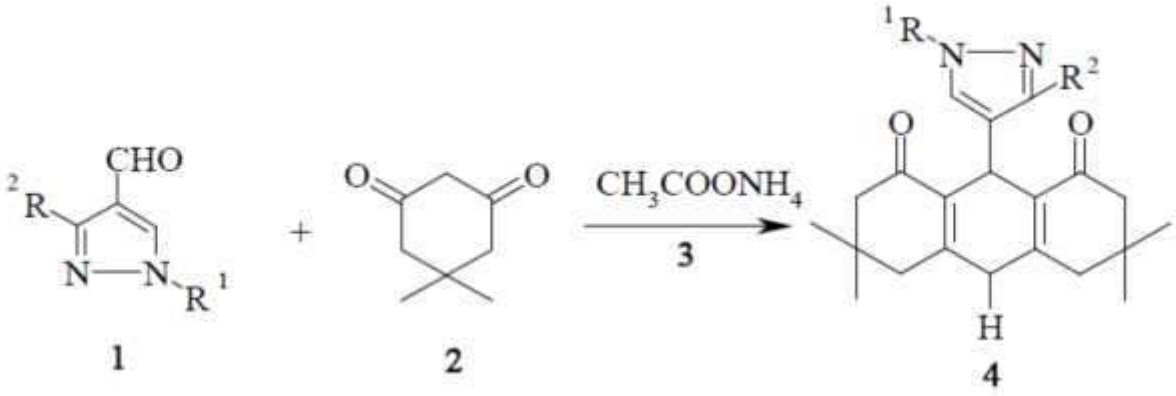
One of the most important problems of modern photoelectronics is the purposeful creation of materials with predetermined physical properties. To create liquid crystal displays, you need dyes not only with certain optical characteristics, but also quite stable under prolonged UV irradiation.

Recently, dyes of decahydroacridine structure have been studied in detail, as they are promising, from the point of view of practical application, as laser materials and fluorescent labels in biological objects. Such materials have highly efficient phototransformation processes.

To construct complex and promising decahydroacridinediones-1,8 with a pyrazole nucleus at position 9, we developed the synthesis conditions and studied their absorption and luminescence spectra depending on the electronic nature of the substituents in the 1st and 3rd positions of the pyrazole nucleus.

The basic synthons for the synthesis of the target hybrid compounds 4 were 1,3-disubstituted 4-pyrazolecarbaldehydes 1, dimedone 2 and ammonium acetate in ethyl alcohol.



R^1= CH_3, CH_2CH_2CN, CH_2CH_2COOH, C_6H_5

R^2 = COOH, $COOC_2H_5$, C_6H_4 , 4-MeC_6H_4 , 4-$MeOC_6H_4$ 3- pyridyl, 4- pyridyl , 2- thienyl, 2-benzofuryl.