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The Role of Silver Iodide in the Formation of Silver Iodobromide Microcrystals Photosensitivity

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Testing model large crystals and emulsion microcrystals of AgBr(I) we obtained experimental data about the extremely irregular distribution of AgI in AgBr, even if the averaged AgI concentration is small. This irregularity was expressed in the formation of channel-like insertions of AgI, piercing through AgBr, moreover, places of their exit to surface have properties and functions of sensitive centres. Certain literary and our own data, confirming the channel-like character of AgI insertions in AgBr and the presence of the wide behaviour analogy of AgI and Ag S surface epitaxies on AgBr, are produced.

Anomalously high mobile Ag ions concentration in AgI epitaxies on AgBr emulsion microcrystals, showing that AgI channel-like insertions were in a highly disordered state, was discovered. It is connected with the possibility of only two AgI lattice-types in encirclement of a face-centered cubic (f.c.c.) AgBr lattice being possible: either AgI becomes face-centred too (and high disorder is inevitable) or it becomes body-centred cubic (b.c.c.); it is corresponding to superionic phase). Such a conclusion is also in good agreement with the available data on AgI and Ag S epitaxies similarity and on the superionic nature of Ag S in sensitive centres.

It is concluded that the effect of AgI on the AgBr(I) integral photosensitivity is determined only feebly by the increase of the actinic flow, connected with the expansion of the sensitive region to the long-wave side. The main reasons of AgI effect are: firstly, the formation of AgI photosensitivity centres on the surface of AgBr, and secondly, AgI insertions are the channels for mobile Ag ions transport to the surface.