

Galena as the most important silverbearing ore is found in almost every Ag deposit. If the content of Ag is higher than 0,5 wt. % then is called galena solid solution – PbS_{ss} . The galena Ag has two forms of occurrence - inclusions and isomorphic silver. About ninety percent of galena Ag is product of retrograde process of PbS_{ss} cooling. These are matildite ($AgBiS_2$), miargyrite ($AgSbS_2$), diaforite ($PbAg_3Sb_3S_8$), freislebenite ($AgPbSbS_3$), pyrargyrite (Ag_3SbS_3), aramayoite ($Ag(Sb,Bi)S_2$), freibergite ($Ag_{12}Sb_4S_{13}$), gustavite ($AgPbBi_3S_6$) etc. The smaller amount of isomorphic Ag is substituted as $2Ag^+ = Pb^{II+}$. Under the usual conditions of deposition (200 - 300°C), the solubility of Ag_2S is too low. The content of Ag in galena under these conditions is not higher than 0,4 mol. % at 615°C. Most of the isomorphic Ag is bound in coupled substitution $Ag^+ + Bi^{III+}/Sb^{III+} = 2 Pb^{II+}$. In this case the content of Ag in PbS can be as high as 9 wt. % at 350 - 400°C. At the deposits where wasn't activated this Bi/Sb – Pb coupled substitution the content of Ag in galena is very low. The content of trace elements of Ag, Bi and Sb can also influence the galena crystal habit. Galena rich on Bi usually creates octahedral crystals. Galena with a higher content of Ag and Sb usually creates cubic crystals.