

### **Low Temperature Anomaly of Plasticity and a Local Arrangement in Pb-In Alloys**

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The temperature dependencies of the yield stress and the strain rate sensitivity of flow stress for Pb-1; 5; 10 and 20 at. % In single crystals were studied by tension in the temperature range 0,5 - 295 K. For Pb-1;5 and 10 at. % In the dislocation-impurity interaction parameters estimated from the experimental data were found typical for thermally activated depinning of dislocations from solute atoms at deformation temperatures 30 – 140 K. The anomaly of plasticity in these alloys below 30 K is consistent with the inertial unzipping of dislocations from impurity atoms. However, a further increase in indium concentration up to 20 at. % it was found affect the experimental dependencies, contradicting the above conclusions. The estimated plasticity parameters of concentrated alloy are seems to be atypical for the case of impurity atom as an effective barrier for mobile dislocations. For understanding this contradictions the Cowley's local order parameters  $\alpha$  was estimated from the diffuse X-ray scattering measurements. The expected positive values of  $\alpha$  indicate that clustering takes place in this system.. For Pb-1 at. % In alloy  $\alpha=0$ , but as the indium concentration increase the clustering becomes more dominant. The interaction of clusters with mobile dislocations leads to modify the mechanisms of low temperature plasticity and can explain the experimental data for concentrated alloy.

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