MS26-P01 | Peculiarities Of Solid Solutions With NaTl-Type Structure In Li-Zn-X (X=Al,Ga,In) Systems

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Li-Zn-X (X=Al,Ga,In) systems are characterized by forming of solid solutions across LiZn-LiX section with NaTl-type structure. This is expected, because all binary compounds of this section have the same structure type whith, only differences in the lattice parameters: *a* = 6.209 Å for LiZn, *a* = 6.3757 Å for LiAl, *a* = 6.195 Å for LiGa and *a* = 6.786 Å for LiIn. Main task of our research was to compare these solid solutions.

As expected from the very close lattice parameters of LiZn and LiGa binary compounds, continuous solid solution $Li(Zn_{1-x}Ga_x)$ is formed in the Li-Zn-Ga system. A peculiarity of this solid solution is than only very small shifts of lattice parameters are observed within the full composition range. The difference of lattice parameters of LiZn and LiAl binary compounds is not very high. Nevertheless, the change of lattice parameters within the continuous solid solution $Li(Zn_{1-x}Al_x)$ are more pronounced. In contrast, the difference of lattice parameters of LiZn and LiIn binary compounds is very big and no continuous solid solution $Li(Zn_{1-x}In_x)$ is formed for the Li-Zn-In system. Instead a two phase region was clearly observed along the LiZn-LiIn quasibinary cut at the composition $Li(Zn_{0.75}In_{0.25})$. Both limited solid solutions crystallize in the NaTl-type structure, but have different lattice parameters: 6.4111(1) Å for the solid solution $Li(In_{1-x}Zn_x)$ (x=0.75) and 6.3250(1) Å for the solid solution $Li(Zn_{1-x}In_x)$ (x=0.25).