[MS28-P02] Novel Compounds with $La_2Mo_2O_9$ Structure in $La_2Mo_2O_9$ - $Ln_2W_2O_9$ - $Ln_2Mo_2O_9$ Systems (Ln = Pr, Nd, Sm).

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The high oxygen ion conductivity (0.06 S/cm at 800ºC) of $La_2Mo_2O_9$ (LM) was found in 2000 [1]. This compound has been studied in recent years as potential material for electrochemical systems. Rare earth molybdates of $1Ln_2O_3$:$2MoO_3$ compositions exist only for Ln = La, Pr. This structure is preserved at the partial substitution of lantanum or molybdenum with some impurities. Polymorphism in LM depends on type and concentration of impurities. Tungstates of similar composition exist for Ln = La, Pr, Nd, Sm, Eu, Gd. With the purpose of extending of $La_2Mo_2O_9$ family, the ternary systems $La_2Mo_2O_9$ -$Ln_2W_2O_9$ -$Ln_2Mo_2O_9$, where Ln = Pr, Nd, Sm, were investigated by X-ray and DSC methods with using polycrystalline samples, obtained by solid state reaction in air. Wide field of existence of compounds with LM structure restricted by $La_2Mo_2O_9$ -$La_{0.6}Pr_{1.4}Mo_{0.6}W_{1.4}O_9$ -$Pr_2Mo_{0.9}W_{1.1}O_9$ - $Pr_2Mo_2O_9$ was found in Pr-contained ternary system. In contrast to $La_2Mo_2O_9$, $Pr_2Mo_2O_9$ is unstable and decomposes at 900ºC. This thermal instability can be eliminated by doping with more than 10% W or La. In the case of Ln = Nd the above field becomes narrower and restricted by compositions $La_2Mo_2O_9$ - $La_{0.8}Nd_{1.2}Mo_{0.8}W_{1.2}O_9$ - Nd_2MoWO_9 -$Nd_2Mo_{1.8}6W0.14O_9$ - $La_{0.4}Nd_{1.6}Mo_2O_9$. "$Nd_2Mo_2O_9$" does not exist in pure form, but in $Nd_2Mo_{2-x}W_xO_9$ binary system, with full replacement of La with Nd, compounds with LM structure are formed at partial substitution of Mo with 7-50% W. In the system with Sm field of the existence of compound with the structure of the LM is significantly narrower and limited by $La_2Mo_2O_9$ -$La_{0.8}Sm_{1.2}Mo_{0.8}W_{1.2}O_9$ -$La_2Mo_{0.5}W_{0.5}O_9$ triangle. Compounds with the complete replacement of La with Sm do not exist in this system. So, the analysis of three ternary systems has shown that at decrease of the ion radius of rare-earth element the existence region of compound with the LM structure is reduced. According to DSC data, substitution of Mo with W and La with Nd, Pr, Sm leads to stabilization of cubic phase. The conductivity of the compounds in ternary systems is slightly lower than that of pure LM. It can be assumed that W-contained compounds in the above ternary systems may have improved chemical stability under reducing conditions in comparison with pure LM. This work is supported by RFBR (grant No. 11-0300243-a).

[1] Lacorre P. Goutenoire F. Bohnke O. Retoux R. Laligant Y. (2000) *Nature*. **404.** 856-859.

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