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## **Structural and optical properties of $\text{LiT}_x\text{Mn}_{2-x}\text{O}_4$ ( $T = \text{Cr}$ and $\text{Ti}$ ) thin films grown by sol-gel method**

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Using sol-gel method employing spin-coating process,  $\text{LiT}_x\text{Mn}_{2-x}\text{O}_4$  ( $T = \text{Cr}$  and  $\text{Ti}$ ) thin films were grown on Si(100) substrates. By Cr doping, cubic  $\text{LiCr}_x\text{Mn}_{2-x}\text{O}_4$  films were produced without any secondary phase up to  $x = 1$ . A decrease of the lattice constant was observed in the  $\text{LiCr}_x\text{Mn}_{2-x}\text{O}_4$  films up to  $x = 0.6$ . However, an increase of the lattice constant was observed for  $x > 0.6$ . In case of Ti doping, cubic  $\text{LiTi}_x\text{Mn}_{2-x}\text{O}_4$  films were produced for  $x \leq 0.6$ , however,  $\text{TiO}_2$  phase was found for higher  $x$ . The atomic valence of the dopant ions was investigated by using X-ray photoelectron spectroscopy. Optical properties of the films were investigated by using spectroscopic ellipsometry in the visible-ultraviolet range. Observed optical absorption structures are interpreted in terms of charge-transfer and crystal-field transitions involving octahedral  $\text{Mn}^{3+}$  ions. A reduction of CT transition strength is interpreted as due to the reduction of the  $\text{Mn}^{3+}$  density through the dopant substitution.