

# PEMBUATAN LAPISAN TIPIS MANGAN OKSIDA DAN LITIMUM-MANGAN OKSIDA PADA SUBSTRAT KACA DENGAN METODA *DIP-COATING* MELALUI PROSES SOL-GEL

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**ABSTRACT:** Preparation of manganese oxide and lithium-manganese oxide thin layer on glass substrate by dip-coating method via sol-gel process have been investigated. Manganese (II) nitrate tetrahydrate and lithium chloride were used as precursors, isopropanol as solvent and DEA as additive. Dip-coating process have been done on glass substrate at 6 times with dipping time around 2 minutes for each layer process and dried at 110-120 °C around 15 minutes. Dried samples heated at 400 °C, 500 °C and 600 °C during 120 minutes. Black thin layer were obtained as products. The products were characterized by X-ray Diffraction (XRD) and Scanning Electron Microscopy (SEM). The XRD pattern was shown manganese oxide thin layer were obtained  $Mn_2O_3$  only. Crystal structure of  $Mn_2O_3$  was orthorombic with crystallite size around 13.0 nm (JCPDS No. 24-0508). SEM image (at 500 °C) showed uniform and smooth surfaces with grain size around 0,01  $\mu m$ . The XRD patterns showed that lithium-manganese oxide thin layer were obtained  $LiMn_2O_4$  and small amount of  $Mn_2O_3$ . Crystal structure of  $LiMn_2O_4$  was spinnel with crystallite size around 16.86 nm (JCPDS No. 35-0782). SEM images (at 400 and 500 °C) showed fiber form were produced generally and spheric form at 600 °C.

**Key words :** *lithium-manganese oxide, dip-coating, sol-gel, fiber, spheric,*