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Anomalous magneto-transport properties of epitaxial Bi_2Te_3 films grown by chemical vapor deposition (CVD) SUYOUN LEE, HYUN-WOO JIN, KWANG-CHON KIM, SEONG KEUN KIM, BYUNG-KI CHEONG, JINSANG KIM, Korea Institute of Science and Technology — We investigated the magneto-transport properties of Bi_2Te_3 films grown by using the chemical vapor deposition (CVD) technique. From the structural analysis using the x-ray diffractometer (XRD) and transmission electron microscope (TEM), the films were found to be highly c-axis oriented with good crystalline quality. The films were found to remain metallic down to 1.8 K with a very high carrier mobility around 30,000 cm^2/Vs despite rather high carrier concentration of about 10^{18} (cm^{-3}). We investigated the behavior of the magneto-resistance (MR) under various orientations of the magnetic field (B). Interestingly, it was found that the MR showed a clear oscillation signal under the in-plane B. In addition, the observed oscillation was quite periodic in $1/B$ implying that the Landau quantization plays a role. As the orientation of B was rotated toward the direction perpendicular to the plane, the oscillation signal disappeared and the resistance showed a very sharp decrease at low magnetic fields, which was consistent with the weak antilocalization (WAL) behavior. Those new findings are believed to be related to the nature of Bi_2Te_3 films as a topological insulator (TI) and to unveil the unexplored aspects of TIs waiting for an explanation.

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