Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary information

S1:

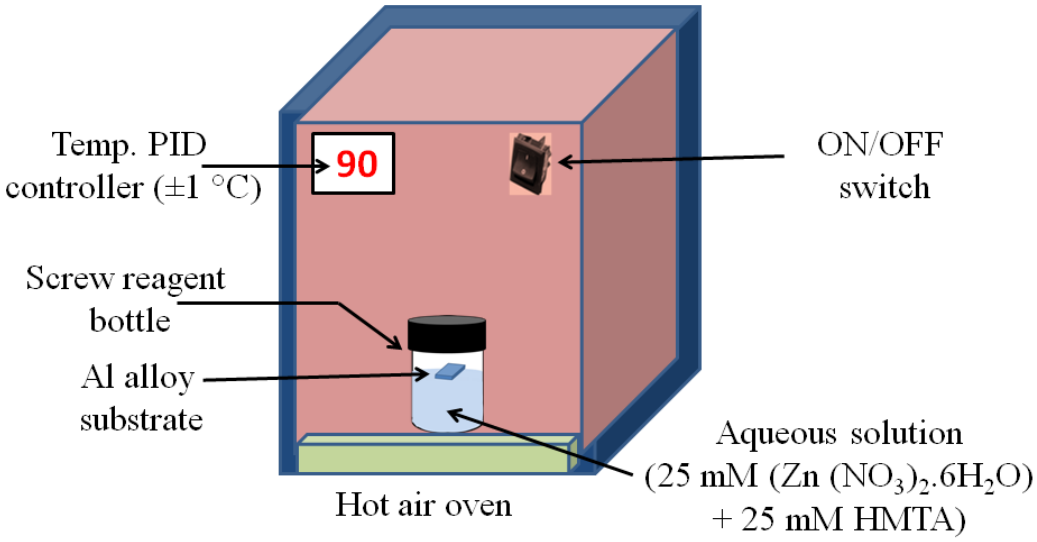

Figure S1: Block diagram of the experimental set up for synthesis process.

S2:

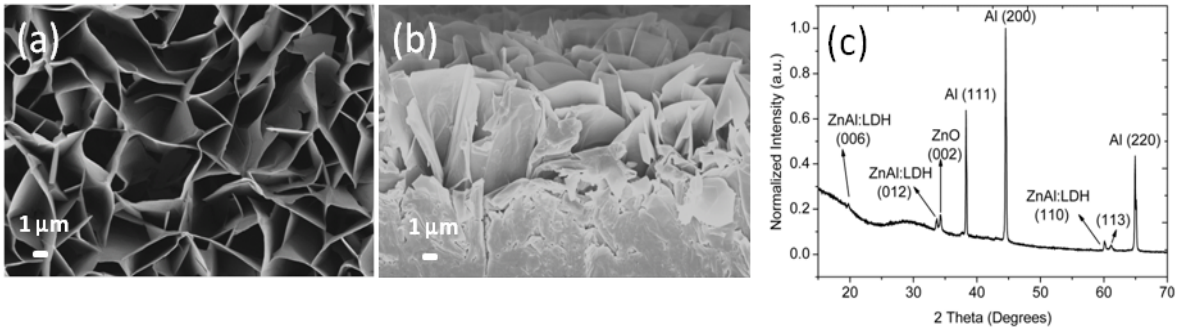

Figure S2: FE-SEM image of 2D ZnO nanosheets at growth temperature of 95 °C (a) Top view, (b) Cross sectional view, (c) XRD pattern.

S3:

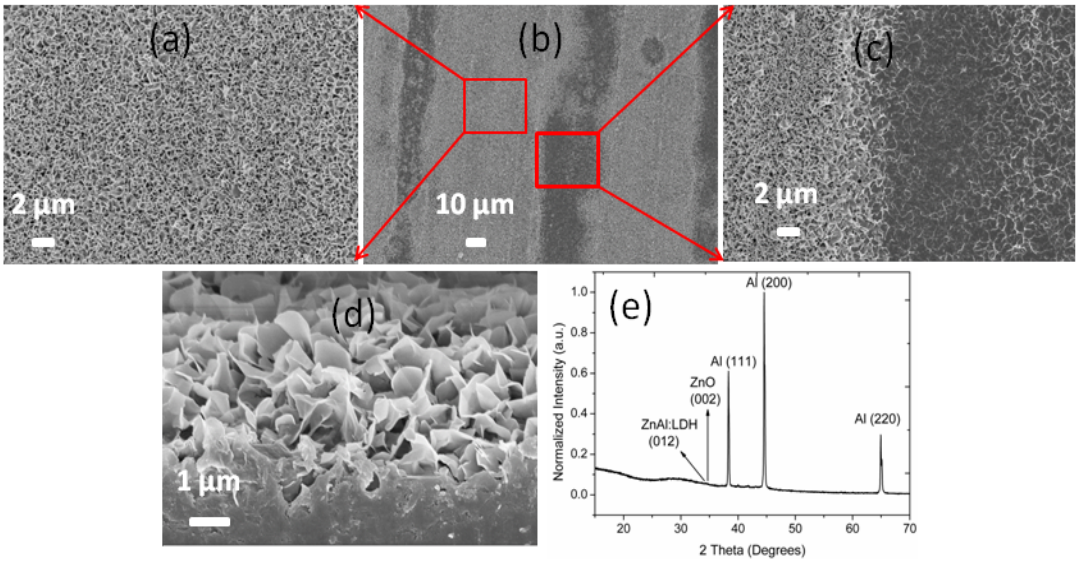

Figure S3: FE-SEM image of 2D ZnO nanosheets at growth temperature of 50 °C: (a) Uniform growth of ZnO nanosheets, (b) ZnO nanosheets at lower magnification, (c) Non-uniform growth of ZnO nanosheets, (d) Cross sectional view of ZnO nanosheets, (e) Corresponding XRD pattern.

S4:

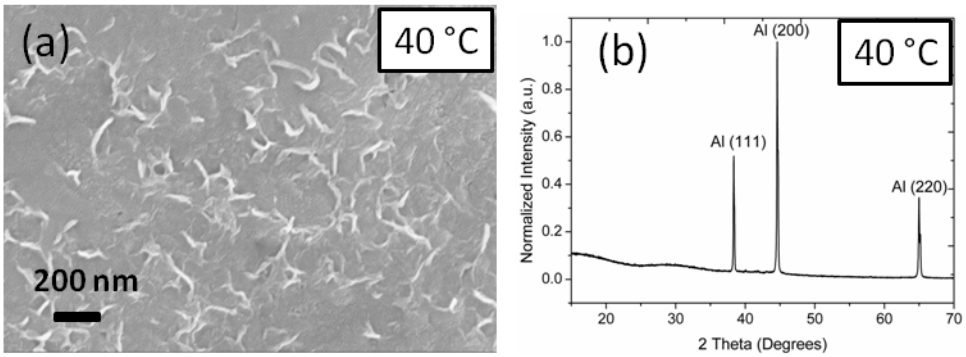

Figure S4: (a) FE-SEM image of the film for the growth temperature of 40 °C, (b) Corresponding XRD pattern.

S5:

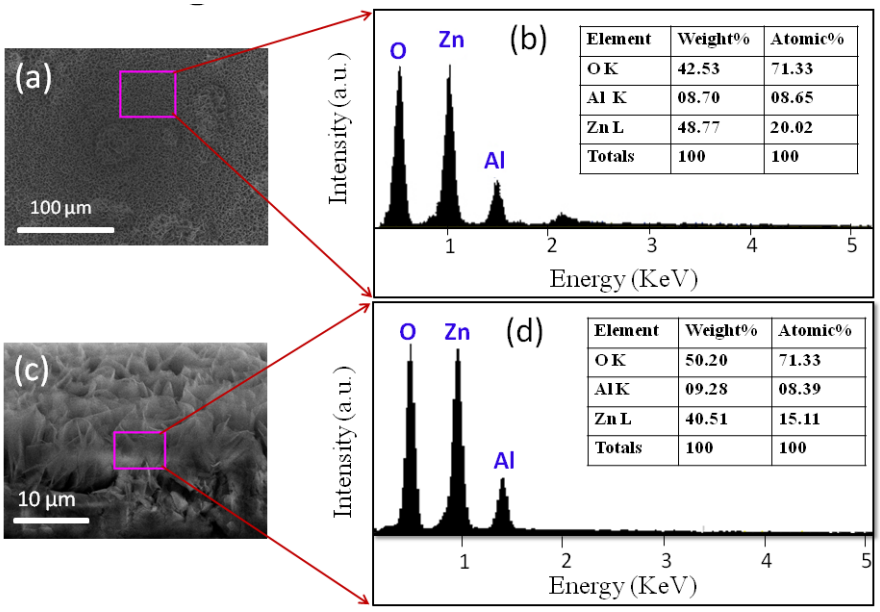

Figure S5: EDX of as grown 2D ZnO nanosheets on Al alloy substrate (a-b) Top view of ZnO nanosheets and its elemental composition (c-d) Cross-sectional view of ZnO nanosheets and its elemental composition.

S6:

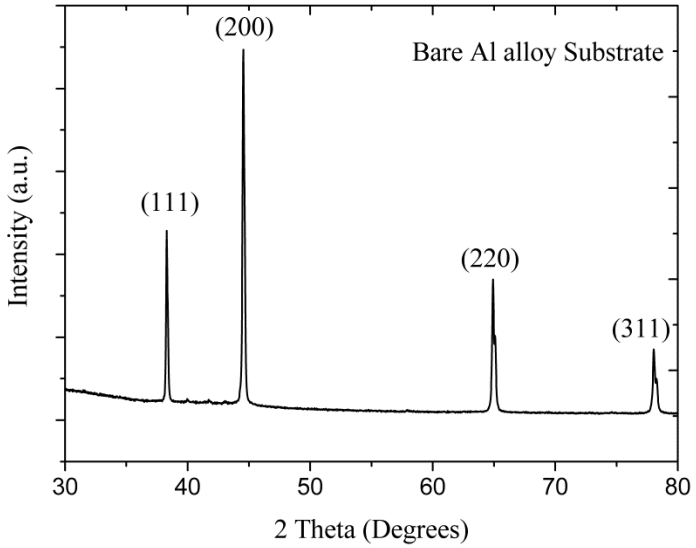

Figure S6: XRD pattern of bare Al alloy substrate **(JCPDF card # 85-1327)**

S7:

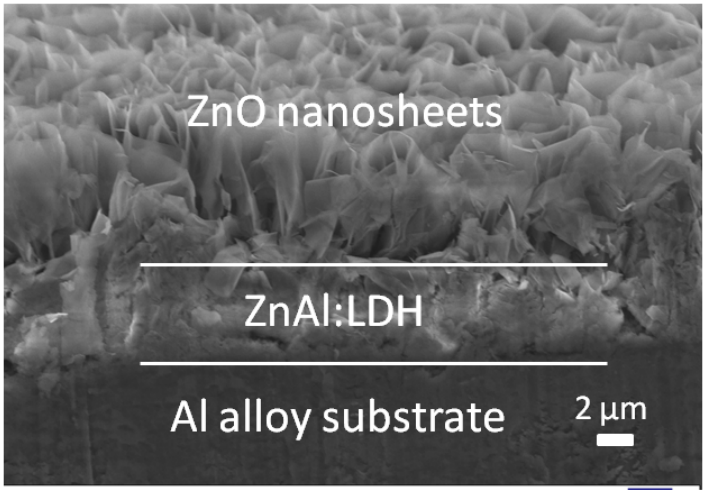

Figure S7: Formation of ZnAl:LDH of 2D ZnO nanosheets.

S8:

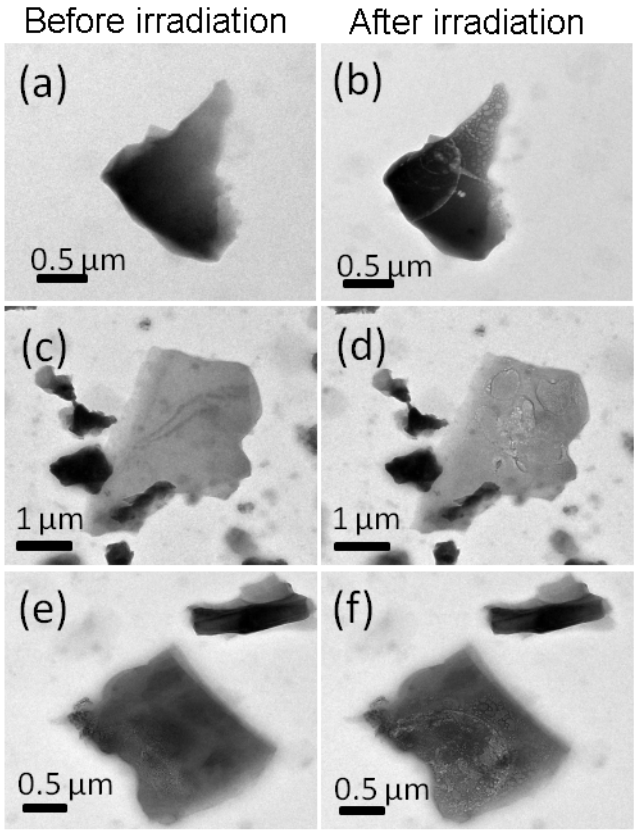

Figure S8: Effect of TEM electron beam on 2D ZnO nanosheet.

Table 1: Effect of growth temperature on height and thickness of 2D ZnO nanosheets.

Growth temperature (°C)	Avg. height (µm)	Avg. thickness (nm)
90	6.50±0.04	84.15±2.94
80	3.03±0.10	41.99±2.38
70	2.39±0.02	33.75±1.69
60	2.19±0.09	22.91±1.33

Table 2: Detailed quantification data

Element	Position (eV)	FWHM (eV)	Area (a.u.)	At% (a.u.)
O 1s	530.81	3.534	14454.48	58.27
C 1s	284.81	3.519	2197.62	25.96
Zn 2p	1020.81	3.418	20930.71	8.61
Al 2p	73.81	2.740	325.30	7.16

S9:

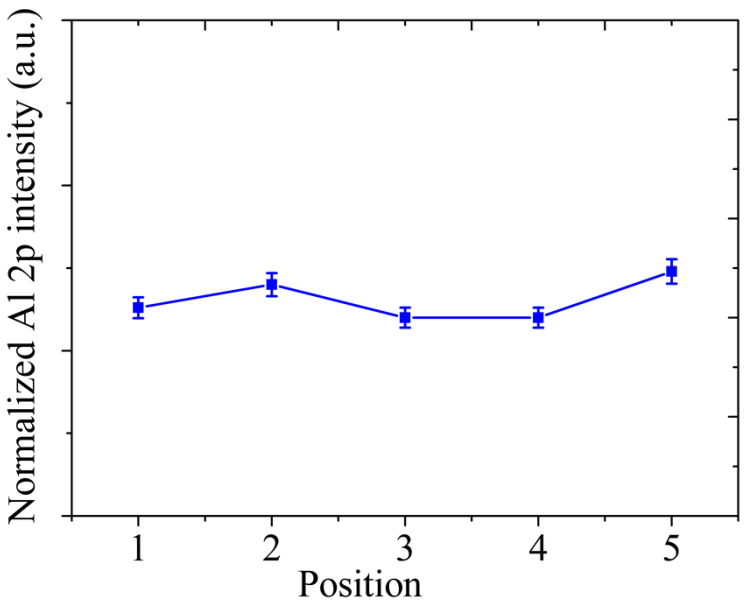

Figure S9: Surface distribution of Al over the ZnO nanosheets.

S10:

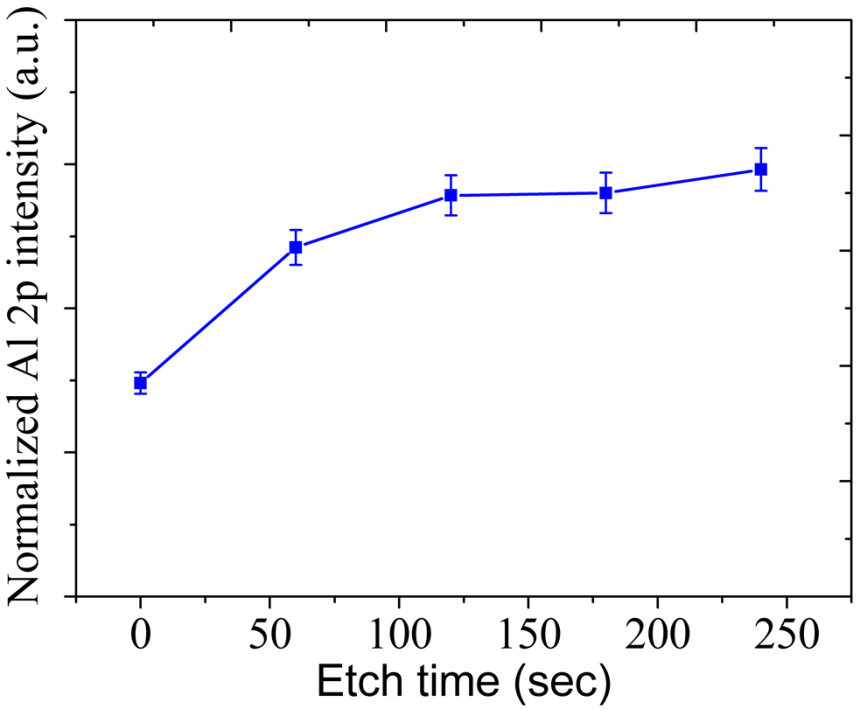

Figure S10: In-depth Al distribution in ZnO nanosheets.