Supporting Information

Some insights into atomic layer deposition of MoN$_x$ using Mo(CO)$_6$ and NH$_3$ and its diffusion barrier application

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Fig. S1: GIAXRD carried out with a lower grazing angle ($1^\circ$) for the ALD-MoN$_x$ films at two different deposition temperatures clearly revealing a poor crystallinity appeared in the as-grown film at and beyond 200 °C.

Fig. S2: (a) Variation of the sheet resistance of the as-grown MoN$_x$ films as a function of deposition temperature. (b) Variation of the sheet resistance of the as-grown MoN$_x$ films as a function of time.
temperature and (b) the sheet resistance of those films as measured over few days to study the stability of the MoNx film.

![Graph showing atomic percentage of Mo, N, O, Si over etch time](image)

**Fig. S3:** Atomic percentage of Mo, N, O, and Si in the film and substrate obtained from the quantitative depth analysis of XPS of the as-grown MoNx film deposited at 225 °C.
Fig. S4: Atomic percentage of Mo & N in the film and O & Si in substrate obtained from the quantitative depth analysis of SIMS of the as-grown MoNₓ film deposited at 225 °C.
Fig. S5: Cross-sectional view SEM images of the MoN$_x$ films grown by 500 ALD cycles on Si/SiO$_2$ substrate deposited at (a) 225 and (b) 275 °C revealing the uniform film.
Fig. S6: (a) SEM-EDS spectra confirming the presence of Mo and N on Si/SiO₂, elemental mapping of (b) Mo and (c) N reflecting their uniform presence throughout the film.
Fig. S7: The XRD of the films grown at (a) 225 and (b) 275 °C followed by a post-annealing at different temperatures (500, 600 and 700 °C).

Fig. S8: The c-SEM of the PEALD-MoN grown on Si/SiO₂ (by 500 ALD cycles at 180 °C).