APPENDIX-4

STOICHIOMETRY

Dehydrogenation of n-dodecane to n-dodecene and hydrogen

Moles of paraffin fed = \( m \)

Moles of hydrogen fed = \( 6m \), since hydrogen:hydrocarbon ratio was 6 for all experiments

Total moles fed = \( 7m \)

System pressure = atmospheric

Therefore, at conversion level \( x \),

Moles of paraffin remaining = \( m(1-x) \)

Moles of olefin formed = \( mx \)

Moles of hydrogen in the system = moles of hydrogen fed + moles of hydrogen formed

= \( 6m + mx \)

= \( m(6+x) \)

Total moles present = \( m(1-x) + mx + m(6+x) \)

= \( m(7+x) \)

Mole fractions of,

(1) Paraffin

= \( \frac{m(1-x)}{m(7+x)} \)

(2) Olefin

= \( \frac{mx}{m(7+x)} \)

(3) Hydrogen

= \( \frac{m(6+x)}{m(7+x)} \)