

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,

$$(1) \text{ Paraffin} \quad = \frac{m(1-x)}{m(7+x)} = \frac{(1-x)}{(7+x)}$$

$$(2) \text{ Olefin} \quad = \frac{mx}{m(7+x)} = \frac{x}{(7+x)}$$

$$(3) \text{ Hydrogen} \quad = \frac{m(6+x)}{m(7+x)} = \frac{(6+x)}{(7+x)}$$