Catalytic Decomposition of Methane

$$CH_4 \xrightarrow[\text{Catalyst}]{\text{Energy}} \text{nano structured carbon} + 2H_2$$

$\Delta H° = 75.6 kJ/mole$
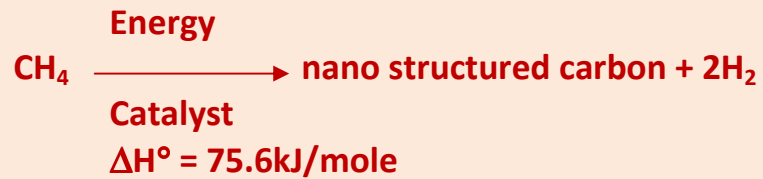
- Single step process

- Due to absence of oxidants (H_2O and O_2) no CO_x are formed

- Energy requirement per mole of H_2 produced is 37.8kJ/mole H_2 only (conventional SRM process 63.3kJ/mole

- Pure carbon (nano-structured) is produced – valuable by-product