

APPARATUS FOR PRODUCTION OF CARBON NANOTUBES AND HYDROGEN FROM PYROLYSIS GASES

Abstract

Disclosed herein is an apparatus for the production of carbon nanotubes and hydrogen from a pyrolysis gas. The apparatus requires a sorbent reactor portion, a liquid trapping means or apparatus attached to the outlet of the sorbent reactor portion and a chemical vapour deposition reactor portion. The sorbent reactor portion includes a first reaction vessel having an inlet configured to accept a pyrolysis gas from a pyrolysis gas source and an outlet; a solid sorbent and/or a solid sorbent precursor, where the solid sorbent is suitable to adsorb CO₂ from a pyrolysis gas situated within the first reaction vessel, such that a pyrolysis gas passes over the sorbent in its passage from the inlet to the outlet; and a heating means or apparatus suitable to provide and maintain a temperature of greater than 100 °C within the first reaction vessel. The chemical vapour deposition reactor portion includes a second reaction vessel having an inlet configured to accept a pyrolysis gas that has passed through the liquid trapping means or apparatus and an outlet; a catalyst suitable to convert at least a portion of the pyrolysis gas into carbon nanotubes and hydrogen gas situated within the reaction vessel, such that a pyrolysis gas passes over the catalyst in its passage from the inlet to the outlet; and a heating means or apparatus suitable to provide and maintain a temperature of greater than 100 °C within the second reaction vessel.

FIG. 3