What is claimed is:

1. A fluidized bed reactor for preparing para-xylene and co-producing light olefins from methanol and/or dimethyl ether and benzene, wherein the fluidized bed reactor comprises a reaction zone, a dilute phase zone, a first reactor feed distributor and a plurality of second reactor feed distributors, the first reactor feed distributor and the plurality of second reactor feed distributors are sequentially arranged from bottom to top in the reaction zone; wherein the reaction zone is located in a lower part of the fluidized bed reactor, and the dilute phase zone is located in an upper part of the fluidized bed reactor;

wherein the fluidized bed reactor comprises a first reactor gas-solid separator, the first reactor gas-solid separator is placed in the dilute phase zone or outside a reactor shell, the first reactor gas-solid separator is provided with a regenerated catalyst inlet, a catalyst outlet of the first reactor gas-solid separator is placed at the bottom of a reaction zone, and a gas outlet of the first reactor gas-solid separator is placed in the dilute phase zone.

2. The fluidized bed reactor of claim 1, wherein the number of the second reactor feed distributors is in a range from 2 to 10.

3. The fluidized bed reactor of claim 1, wherein the fluidized bed reactor further comprises a second reactor gas-solid separator, the second reactor gas-solid separator is placed in the dilute phase zone or outside the reactor shell;

an inlet of the second reactor gas-solid separator is placed in the dilute phase zone, a catalyst outlet of the second reactor gas-solid separator is placed in the reaction zone, and a gas outlet of the second reactor gas-solid separator is connected to a product gas outlet of the fluidized bed reactor;

the first reactor gas-solid separator and the second reactor gas-solid separator are cyclone separators.

4. The fluidized bed reactor of claim 1, wherein the fluidized bed reactor comprises a reactor heat extractor, and the reactor heat extractor is arranged inside or outside the reactor shell; and

the reactor heat extractor is arranged between a plurality of reactor feed

distributors comprising the first reactor feed ditributor and the plurality of second reactor feed distrbutors.

5. The fluidized bed reactor of claim 1, wherein the fluidized bed reactor comprises a reactor stripper, the reactor stripper passes through the reactor shell from the outside to the inside at the bottom of the fluidized bed reactor and is opened in the reaction zone of the fluidized bed reactor, and a reactor stripping gas inlet and a spent catalyst outlet are arranged at the bottom of the reactor stripper.

6. A device for preparing para-xylene and co-producing light olefins from methanol and/or dimethyl ether and benzene, wherein the device comprises a fluidized bed reactor comprising a reaction zone, a dilute phase zone, a first reactor feed distributor and a plurality of second reactor feed distributors, the first reactor feed distributor and the plurality of second reactor feed distributors are sequentially arranged from bottom to top in the reaction zone and a fluidized bed regenerator for regenerating a catalyst;

wherein the reaction zone is located in a lower part of the fluidized bed reactor, and the dilute phase zone is located in an upper part of the fluidized bed reactor;

wherein the fluidized bed reactor comprises a first reactor gas-solid separator, the first reactor gas-solid separator is placed in the dilute phase zone or outside a reactor shell, the first reactor gas-solid separator is provided with a regenerated catalyst inlet, a catalyst outlet of the first reactor gas-solid separator is placed at the bottom of a reaction zone, and a gas outlet of the first reactor gas-solid separator is placed in the dilute phase zone.

7. The device of claim 6, wherein the fluidized bed regenerator is a turbulent fluidized bed regenerator, and the fluidized bed regenerator comprises a regenerator shell, a regenerator gas-solid separator, a regenerator heat extractor and a regenerator stripper; the lower part of the fluidized bed regenerator is a regeneration zone, the upper part of the fluidized bed regenerator is a dilute phase zone of the regenerator, a regenerator feed distributor is placed at the bottom of the regeneration zone, the regenerator heat extractor is placed in the regeneration zone, and the

regenerator gas-solid separator is placed in the dilute phase zone or outside the regenerator shell; and

an inlet of the regenerator gas-solid separator is placed in the dilute phase zone of the regenerator, a catalyst outlet of the regenerator gas-solid separator is placed in the regeneration zone, and the regenerator stripper is opened at the bottom of the regenerator shell.

8. The device of claim 6, wherein the fluidized bed regenerator comprises a regenerator shell, a regenerator feed distributor, a regenerator gas-solid separator, a regenerator heat extractor, a flue gas outlet and a regenerator stripper;

the fluidized bed reactor further comprises a reactor stripper, the reactor stripper passes through the reactor shell from the outside to the inside at the bottom of the fluidized bed reactor and is opened in the reaction zone of the fluidized bed reactor, and a reactor stripping gas inlet and a spent catalyst outlet are arranged at the bottom of the reactor stripper;

a lower part of the fluidized bed regenerator is a regeneration zone, and an upper part of the fluidized bed regenerator is a dilute phase zone;

the regenerator feed distributor is placed at the bottom of the regeneration zone, the regenerator heat extractor is placed in the regeneration zone, the regenerator gas-solid separator is placed in the dilute phase zone or outside the regenerator shell, an inlet of the regenerator gas-solid separator is placed in the dilute phase zone, a catalyst outlet of the regenerator gas-solid separator is placed in the regeneration zone, a gas outlet of the regenerator gas-solid separator is connected to the flue gas outlet, and the regenerator stripper is opened at the bottom of the regenerator shell;

a spent catalyst outlet of the reactor stripper is connected to an inlet of an inclined spent catalyst pipe, a spent catalyst sliding valve is arranged in the inclined spent catalyst pipe, an outlet of the inclined spent catalyst pipe is connected to an inlet of a spent catalyst lift pipe, a bottom of the spent catalyst lift pipe is provided with a spent catalyst lifting gas inlet, and an outlet of the spent catalyst lift pipe is connected to the dilute phase zone of the fluidized bed regenerator; and

a bottom of the regenerator stripper is provided with a regenerator stripping gas inlet, the bottom of the regenerator stripper is connected to an inlet of an inclined regenerated catalyst pipe, a regenerated catalyst sliding valve is arranged in

the inclined regenerated catalyst pipe, an outlet of the inclined regenerated catalyst pipe is connected to an inlet of a regenerated catalyst lift pipe, a bottom of the regenerated catalyst lift pipe is provided with a regenerated catalyst lifting gas inlet, an outlet of the regenerated catalyst lift pipe is connected to the regenerated catalyst inlet of the first reactor gas-solid separator.

9. A method for preparing para-xylene and co-producing light olefins from methanol and/or dimethyl ether and benzene, wherein a fluidized bed reactor comprising a reaction zone, a dilute phase zone, a first reactor feed distributor and a plurality of second reactor feed distributors is used in the method, the first reactor feed distributor and the plurality of second reactor feed distributors are sequentially arranged from bottom to top in the reaction zone;

wherein the reaction zone is located in a lower part of the fluidized bed reactor, and the dilute phase zone is located in an upper part of the fluidized bed reactor;

wherein the fluidized bed reactor comprises a first reactor gas-solid separator, the first reactor gas-solid separator is placed in the dilute phase zone or outside a reactor shell, the first reactor gas-solid separator is provided with a regenerated catalyst inlet, a catalyst outlet of the first reactor gas-solid separator is placed at the bottom of a reaction zone, and a gas outlet of the first reactor gas-solid separator is placed in the dilute phase zone;

wherein, the method for preparing para-xylene and co-producing light olefins from methanol and/or dimethyl ether and benzene comprises following steps:

(1) feeding a material stream A containing methanol and/or dimethyl ether and benzene into the reaction zone of the fluidized bed reactor from the first reactor feed distributor to be in contact with a catalyst;

(2) feeding a material stream B containing methanol and/or dimethyl ether into the reaction zone of the fluidized bed reactor from the plurality of second reactor feed distributors to be in contact with the catalyst, to form a material stream C containing para-xylene and light olefins products and a spent catalyst.

10. The method of claim 9, wherein the material stream C is separated to obtain para-xylene, light olefins, $C_{5+}$ chain hydrocarbons, aromatic by-products and

unconverted methanol, dimethyl ether and benzene;

wherein the unconverted methanol and dimethyl ether are fed into the reaction zone of the fluidized bed reactor from the plurality of second reactor feed distributors, the aromatic by-products and the unconverted benzene are fed into the reaction zone of the fluidized bed reactor from the first reactor feed distributor to be in contact with the catalyst.

11. The method of claim 9, wherein the spent catalyst is regenerated by a fluidized bed regenerator and fed to the bottom of the reaction zone of the fluidized bed reactor.

12. The method of claim 9, wherein the method further comprises the steps of:

(3) separating the material stream C obtained from the step (2) to obtain a material stream C-1 containing unconverted methanol and/or dimethyl ether, a material stream C-2 containing unconverted benzene and aromatic by-products; the material stream C-1 is respectively fed into the reaction zone of the fluidized bed reactor from the plurality of second reactor feed distributors to be in contact with the catalyst; the material stream C-2 is fed into the reaction zone of the fluidized bed reactor from the first reactor feed distributor to be in contact with the catalyst; wherein the number of the second reactor feed distributors is in a range from 2 to 10;

the aromatic by-products comprise toluene, o-xylene, m-xylene, ethylbenzene and $C_{9+}$ aromatics; and

(4) regenerating the spent catalyst obtained from the step (2) by a fluidized bed regenerator, the regenerated catalyst is gas-solid separated by the first reactor gas-solid separator, and then is fed to the bottom of the reaction zone in the fluidized bed reactor.

13. The method of claim 9, wherein in a mixture fed from the first reactor feed distributor into the fluidized bed reactor, the ratio of the molecular moles of benzene to the carbon moles of methanol and/or dimethyl ether is greater than 0.5.

14. The method of claim 9, wherein the raw material A contains

methanol and benzene, and the molar ratio of all oxygen-containing compounds fed from the plurality of second reactor feed distributors into the fluidized bed reactor to the methanol fed from the first reactor feed distributor is greater than 1.

15. The method of claim 12, wherein the spent catalyst passes through a reactor stripper, an inclined spent catalyst pipe, a spent catalyst sliding valve and a spent catalyst lift pipe into a dilute phase zone of the fluidized bed regenerator;

a regeneration medium enters the regeneration zone of the fluidized bed regenerator and reacts with the spent catalyst to perform calcination to produce a flue gas containing CO and $CO_2$ and the regenerated catalyst, and the flue gas is discharged after dust removal by a regenerator gas-solid separator;

the regenerated catalyst passes through a regenerator stripper, an inclined regenerated catalyst pipe, a regenerated catalyst sliding valve and a regenerated catalyst lift pipe into the regenerated catalyst inlet of the first reactor gas-solid separator, and after the gas-solid separation, the regenerated catalyst enters the bottom of the reaction zone in the fluidized bed reactor;

a reactor stripping gas enters the reactor stripper via a reactor stripping gas inlet and contacts countercurrent with the spent catalyst, and then enters the fluidized bed reactor; a spent catalyst lifting gas enters the spent catalyst lift pipe via a spent catalyst lifting gas inlet and contacts cocurrent with the spent catalyst, and then enters the dilute phase zone of the fluidized bed regenerator;

a regenerator stripping gas enters the regenerator stripper via a regenerator stripping gas inlet and contacts countercurrent with the regenerated catalyst, and then enters the fluidized bed regenerator; a regenerated catalyst lifting gas enters the regenerated catalyst lift pipe via a regenerated catalyst lifting gas inlet and contacts concurrent with the regenerated catalyst, and then enters the regenerated catalyst inlet of the first reactor gas-solid separator.

16. The method of claim 15, wherein

the carbon content of the regenerated catalyst is less than or equal to 0.5wt%;

the regeneration medium is at least one of air, oxygen-poor air or water vapor; and/or

the reactor stripping gas, the regenerator stripping gas, the spent catalyst lifting gas and the regenerated catalyst lifting gas are water vapor and/or nitrogen.

17. The method of claim 15, wherein the reaction conditions in the reaction zone of the fluidized bed reactor are: the apparent linear velocity of gas is in a range from 1.0m/s to 8.0m/s, the reaction temperature is in a range from 350°C to 600°C, the reaction pressure is in a range from 0.1MPa to 1.0MPa, and the bed density is in a range from 50kg/$m^3$ to 500kg/$m^3$.

18. The method of claim 15, wherein the reaction conditions in the regeneration zone of the fluidized bed regenerator are: the apparent linear velocity of the gas is in a range from 0.1m/s to 2m/s, the regeneration temperature is in a range from 500°C to 750°C, the regeneration pressure is in a range from 0.1MPa to 1.0MPa, and the bed density is in a range from 200kg/$m^3$ to 1200kg/$m^3$.