Claims

1. A SAPO-34 molecular sieve whose chemical composition in the anhydrous state is expressed as:
$mDGA\cdot(Si_xAl_yP_z)O_2$;
wherein,
DGA is diglycolamine; m is the molar number of diglycolamine per one mole of $(Si_xAl_yP_z)O_2$, and m is from 0.03 to 0.25;
x, y, z respectively represents the molar number of Si, Al, P, and x is from 0.01 to 0.30, and y is from 0.40 to 0.60, and z is from 0.25 to 0.49, and $x + y + z = 1$.

2. A SAPO-34 molecular sieve according to claim 1, wherein the X-ray diffraction spectrogram of said SAPO-34 molecular sieve includes the diffraction peaks at following peak positions:

No.	2θ
1	9.4445
2	15.942
3	17.7583
4	22.9708
5	29.428

3. A method for preparing said SAPO-34 molecular sieve according to claim 1, including the steps as follows:
(a) deionized water, a silicon source, an aluminum source, a phosphorus source and DGA are mixed according to a certain ratio, and an initial gel mixture with following molar ratio is obtained:
SiO_2/Al_2O_3 is from 0.05 to 2.5;
P_2O_5/Al_2O_3 is from 0.5 to 1.5;
H_2O/Al_2O_3 is from 5 to 200;
DGA/Al_2O_3 is from 2.5 to 30, DGA is diglycolamine;
(b) the initial gel mixture obtained in said step (a) is transferred into an autoclave, then sealed and heated to crystallization temperature range from 150°C to 220°C, crystallized for crystallization time range from 5h to 72h under the autogenous pressure;
(c) after finishing the crystallization, the solid product is separated, washed to neutral using deionized water and dried to obtain said SAPO-34 molecular sieve.

4. A method according to claim 3, wherein in the initial gel mixture obtained in said step (a), the silicon source is one or more selected from silica sol, active silica, orthosilicate esters and metakaolin; the aluminum source is one or more selected from aluminum salts, activated alumina, aluminum alkoxide and metakaolin; the phosphorus source is one or more selected from phosphoric acid, diammonium hydrogen phosphate, ammonium dihydrogen phosphate, organophosphorous compounds and phosphorus oxides.

5. A method according to claim 3, wherein in said step (b), the crystallization is carried out statically or dynamically.

6. A method according to claim 3, wherein in the initial gel mixture obtained in said step (a), the molar

ratio of organic amine ~~DGA to Al_2O_3~~ DGA/Al_2O_3 is from 5.5 to 16.

~~7. A method for acid-catalyzed reaction using a catalyst which is obtained by calcining at least one of said SAPO-34 molecular sieves according to claims from 1 or 2 or at least one of the SAPO-34 molecular sieve prepared by said methods according to claims from 3 to 6, at a temperature from 400 to 700 °C in air.~~

~~8. A method for oxygenates to olefins reaction using a catalyst which is obtained by calcining at least one of said SAPO-34 molecular sieves according to claims from 1 or 2 or at least one of the SAPO-34 molecular sieve prepared by said methods according to claims from 3 to 6, at a temperature from 400 to 700 °C in air.~~

~~9. A method for adsorption separation of CH_4/CO_2 using a material which is obtained by calcining at least one of said SAPO-34 molecular sieves according to claims from 1 or 2 or at least one of the SAPO-34 molecular sieve prepared by said methods according to claims from 3 to 6, at a temperature from 400 to 700 °C in air.~~