their mixture, preferably from magnesium dihalide, alcohol adduct of magnesium dihalide, and alkoxy magnesium;

the titanium compound is as shown in Formula of $TiB_q(OR_{20})_{4-q}$, in which R_{20} is C_1-C_{20} hydrocarbyl group, B is halogen, and q=0-4, preferably the titanium compound being at least one selected from the group consisting of titanium tetrachloride, titanium tetrabromide, titanium tetraiodide, tetrabutoxy titanium, tetraethoxy titanium, triethoxy titanium chloride, diethoxy titanium dichloride and ethoxy titanium trichloride.

24. The method according to claim 21, wherein the organic alcohol compound is selected from C_2-C_8 monohydric alcohols.

25. The method according to claim 22, wherein the organic epoxide is at least one selected from C_2-C_8 aliphatic olefin, dialkenes, halogenated aliphatic olefin, oxide of dialkenes, glycidyl ethers and inner ethers, preferably from ethylene oxide, propylene oxide, butylenes oxide, butadiene oxide, butadiene dioxide, epoxy chloropropane, methyl glycidyl ether, diglycidyl ether, and terahydrofuran;

the organic phosphorus compound is at least one selected from the group consisting of trimethyl orthophosphate, triethyl orthophosphate, tributyl orthophosphate, triphenyl orthophosphate, trimethyl phosphite, triethyl phosphite, tributyl phosphite, and triphenylmethyl phosphate.

26. A catalyst used for olefin polymerization, comprising a reaction product of the following components:

a). the catalyst component according to any one of claims 1 to 20;

b). a cocatalyst organoaluminium compound; and

c). optionally, an external electron donor, preferably an organosilicon compound.

27. Use of the catalyst according to claim 26 in olefin polymerization.