enough to allow on the one hand the toner to be successfully transferred and to allow the temperature to show a small variation, as is known in the art and on the other hand to prevent the printing system to be contaminated by the toner comprising a wax.

Solution

According to the invention, ~~this object is achieved by~~there is provided a toner for developing a toner image, the toner comprising:

(i) a binder resin, (ii) an inorganic component, preferably a magnetic component, and (iii) a wax, finely dispersed in the binder resin, said wax being an oxidized polyalkylene wax having an acid value from 5 mg KOH/g to 50 mg KOH/g, and the wax having a wax melting transition, wherein the lower temperature limit of said wax melting transition is between 110 °C and 140 °C at the time of temperature rise in the DSC thermogram measured using a differential scanning calorimeter. Said wax melting transition at the time of temperature rise in the DSC thermogram was measured at a heating rate of 10°C/min at the time of rise according to the ASTM D3418 Standard using a differential scanning calorimeter.

According to the invention, there is provided a printing system for applying a toner on an image receiving medium, the toner comprising:

(i) a binder resin,

(ii) an inorganic component, preferably a magnetic component; and

(iii) a wax, finely dispersed in the binder resin, said wax being an oxidized polyalkylene wax having an acid value from 5 mg KOH/g to 50 mg KOH/g, and the wax having a wax melting transition in a temperature range of 110 °C to 140 °C at the time of temperature rise in the DSC thermogram measured using a differential scanning calorimeter,

wherein the lower temperature limit of said wax melting transition is at least 110°C or higher,

the printing system comprising:

(A) a developing means configured for in operation developing a toner image,

(B) an intermediate image bearing means configured for in operation transferring the toner from the developing means to the intermediate image bearing means in a first transfer zone and for transferring the toner from the intermediate image bearing means to an image receiving medium in a second transfer zone.

According to the invention, there is provided a method for producing a toner comprising the steps:

(i) selecting a binder resin,

(ii) selecting an inorganic component, preferably a magnetic component, and;
(iii) selecting a wax, said wax being an oxidized polyalkylene wax having an acid value from 5 mg KOH/g to 50 mg KOH/g, and the wax having a wax melting transition in a temperature range of 110 °C to 140 °C at the time of temperature rise in the DSC thermogram measured using a differential scanning calorimeter, wherein the lower temperature limit of said wax melting transition is at least 1 10 °C or higher
(iv) mixing the magnetic component and the binder resin in a melt kneading process at a temperature above 80 °C, such that the magnetic component is dispersed in the binder resin, said magnetic component dispersion having a number average diameter of less than 5 µm, more preferably less than 2 µm
(v) mixing the wax and the binder resin in a melt kneading process in a melt temperature range between 110 °C to 140 °C, such that the wax is finely dispersed in the binder resin.

Throughout the application, the "lower temperature limit of a wax melting transition at the time of temperature rise" should be interpreted as "the temperature at which at most 10 wt% of the solid wax is molten, when measured at the time of temperature rise in the DSC thermogram, at a heating rate of 10°C/min according to the ASTM D3418 Standard using a TA Instruments Q2000 differential scanning calorimeter", unless stated otherwise.

Advantage

The toner of the present invention comprises at least one binder resin, an inorganic component and at least one wax. The toner of the present invention provides the advantage that the Coefficient of Friction of the toner image, the long-term contamination of the printing system, the fixing performance of the toner image, and the dispersability of the wax in the toner, some of which conflict each other, could be improved by using a wax having a high-melting transition temperature range, more preferably a sharp-melting transition within this melting range. In the context of the present invention, high-melting transition temperature range means that the melting transition temperature range is higher than the temperature at which the toner image is fixed onto the image receiving member. In case an intermediate image bearing means is used and the toner imaged is transferred from the intermediate image bearing means to the image receiving member in a transfuse step, a high-melting transition temperature