Nevertheless, there is a need for coloured sapphire materials that can be useful for numerous uses.

As for example, jewellery may take advantage of sapphire material mechanical properties and desire to obtain a wide range of colour for said material that could be adjusted or chosen according to design or esthetical needs.

As for another example, the lighting industry may also need coloured sapphire materials to manufacture coloured filters.

As for another example, the screen industry may also need coloured sapphire materials to manufacture coloured screens.

Summary

In one aspect, there is provided a treatment method for modifying the reflected colour of a sapphire material surface comprising bombardment by a single- and/or multi-charged gas ion beam so as to produce an ion implanted layer in the sapphire material, wherein:

- the acceleration voltage is chosen in a range between 5kV and 1000 kV;
- the dose of implanted single- and/or multi-charged gas ions per unit of surface area of each ion beam is chosen in a range between 10^{12} ions/cm^2 and 10^{18} ions/cm^2; and,
- the dose of implanted single- and/or multi-charged gas ions and the acceleration voltage are further chosen so that to obtain a modified reflected colour of the treated sapphire material surface compared to the untreated sapphire material surface ; and,
- the ions of the single- and/or multi-charged gas ions are selected from ions of the elements from the list consisting of helium (He), neon (Ne), argon (Ar), krypton (Kr), xenon (Xe), boron (B), carbon (C), nitrogen (N), oxygen (O), fluorine (F), silicon (Si), phosphorus (P) and sulphur (S).

In another aspect, there is provided a part made of synthetic sapphire material comprising at least one surface treated according to the method as disclosed herein, wherein the dominant wavelength, λ_{DT}, of the reflected colour of the treated surface is shifted from at least +50 nm or at least –50

nm from the dominant wavelength, λ_{DU}, of the reflected colour of the untreated sapphire material surface, as for example shifted from at least +100 nm or at least –100 nm.

In a further aspect, there is provided a use of the treatment method as disclosed herein, for treating a solid part made of synthetic sapphire material chosen from the list consisting of a screen, such as for example a touch screen, a window, a watch glass, a lighting device part, such as a light emitting device (LED) part, an optical component, such as for example device lens.

Detailed Disclosure of Embodiments

The aim of the invention is that of offering a method for modifying the reflected colour of a sapphire material that open new routes; preferably, said method is not expensive or even though inexpensive and suitable for treating surfaces meeting the needs of numerous applications.

For this purpose, an object of the invention is a treatment method for modifying the reflected colour of a sapphire material surface comprising bombardment by a single- and/or multi-charged gas ion beam so as to produce an ion implanted layer in the sapphire material, wherein:

- the acceleration voltage is chosen in a range between 5kV and 1000 kV;
- the dose of implanted single- and/or multi-charged gas ions per unit of surface area of each ion beam is chosen in a range between 10^{12} ions/cm^2 and 10^{18} ions/cm^2; and,
- the dose of implanted single- and/or multi-charged gas ions and the acceleration voltage are further chosen so that to obtain a modified reflected colour of the treated sapphire material surface compared to the untreated sapphire material surface ; and,
- the ions of the single- and/or multi-charged gas ions are selected from ions of the elements from the list consisting of helium (He), neon (Ne), argon (Ar), krypton (Kr), xenon (Xe), boron (B), carbon (C), nitrogen (N), oxygen (O), fluorine (F), silicon (Si), phosphorus (P) and sulphur (S).