

## Phosphorescent Pigments Applications in Silicate Systems

Arıcı, E<sup>1</sup>., Ölmez, D<sup>1</sup>., Topçu, N<sup>1</sup>., Altınyay, A<sup>1</sup>., Deniz, G., Karasu, B.<sup>2</sup>

<sup>1</sup>*Belenco Quartz Surfaces, R&D Centre, Manisa/Türkiye*

<sup>2</sup>*Eskişehir Technical University, Department of Materials Science and Engineering,  
Eskişehir/Türkiye*

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Luminescence is defined as light (the near-ultraviolet, visible and the near-infrared regions of electromagnetic spectrum) emission generated by a substance resulting from excitation of its electronic state with the different energy source. Short-lasting light emission from such a substance after being exposed to exciting radiation is called fluorescence, unlike long-lasting one known as phosphorescence. In other words, light emission from a singlet excited state is called fluorescence, if it is from a triplet excited state it can be defined as phosphorescence.

Persistent phosphorescent pigments frequently consist of activating ions (activator) doped, generally being a rare-earth element (such as Ln<sup>3+</sup>, Eu<sup>3+</sup>, Eu<sup>2+</sup>, Ce<sup>3+</sup>, Tb<sup>3+</sup>, Sm<sup>3+</sup>, Pr<sup>3+</sup>, Dy<sup>3+</sup>, Er<sup>3+</sup>, Tm<sup>3+</sup>, Nd<sup>3+</sup>) in relevant systems (like alkaline earth silicates and aluminates), and behaving as an active centre, emitter or trap: The role of the emitter is to supply radiation after the excitation and the trap stores the excitation energy. Phosphorescent pigments evaluated in innovative materials are resistant to heat, atmospheric effects and possess chemical endurance. In the field of high technology and new materials scientists and researchers focus on long-lasting phosphorescent materials and their applications. They are mainly used as emergency signs in buildings and highways, luminous markings in watches, in ceramic decoration and glazes, in resins, brick and tile coatings, in glasses and in quartz surfaces, about which one does not see detailed information.

Quartz surfaces are formed by mixing 90 % quartz with 10 % polyester resin, pouring the mixture into a mould, pressing with vibration under vacuum and curing the mixture with an exothermic reaction taking place at 100 °C. Attractive, modern, new and aesthetical appearances are possibly obtained by using phosphorescent pigments on quartz surfaces. This also provides energy saving by reducing the lighting requirement thanks to the light-emitting feature of the relevant pigments in the dark.