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Now Si_3N_4-based Materials are not only in the Structural but also in the Functional Area

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ABSTRACT

The most important features of engineering ceramics are that they can withstand high temperatures and maintain their mechanical properties at these temperatures. In recent years, engineering ceramics and composite materials have taken a significant part of the metal materials used in the aerospace and defence industries. This creates areas of use based on the structural properties of high-tech ceramics. Si_3N_4-based ceramics are among the main candidates for this group of materials with their structural properties such as their mechanical strength, ability to maintain these properties at high temperatures, and corrosion resistance. However, these areas of use based only on mechanical properties and rapidly advancing technology also show that Si_3N_4-based ceramics are limited to areas of use based on their structural properties. However, high-tech ceramics in which optical properties are improved and mechanical properties can be preserved have been limited to materials such as AlON and YAG. It is a fact that these materials are inadequate compared to Si_3N_4-based ceramics in terms of mechanical and chemical resistance properties at high temperatures. In recent years, studies on the improvement of the optical properties of Si_3N_4-based ceramics show that the optical properties of this material can be improved and its functional properties can be improved as a new application area.

Keywords: Si_3N_4, SiAlON, optical properties, translucent