

## Smart Materials Applications in Ceramics Product Design

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### Abstract:

Ceramic products are important products that reflect multiple uses, and the use of these products has expanded inside and outside architecture, as these products include special uses such as ceilings, floors, and architectural facades. Natural, urban and other functional areas in the urban fabric. This topic has been dealt with from aesthetic or historical angles, or mainly related to interior or aesthetic design, but this research attempts to study ceramic products from the perspective of employing smart materials, where the technological and environmental aspect is activated to reach the best possible performance. With the beginning of the current century, many raw materials appeared the high-performance smart, which has been used in many smart systems in the field of aviation, architectural buildings, the built environment, the automobile industry and submarines, as it has entered into all aspects of our daily lives with what it achieves at the utilitarian, environmental, economic and aesthetic level, in addition to being sustainable. Therefore, this research aims to monitor the general characteristics of using smart materials in designing ceramic products as technical ceramic systems with a technical dimension that are compatible with the environment and the recipient and achieve aesthetic, functional, economic and sustainability aspects. To achieve this goal, the research was divided into three main axes. The first axis dealt with the study of smart materials (the concept and characteristics), while the second axis dealt with the general characteristics of smart materials, and the research ended with the third axis, which dealt with the external and internal applications of smart materials in the design of ceramic products. The research found that the precise properties of smart ceramic materials made it a fertile field for smart applications such as smart nano-ceramic applications, as well as applications in external urban spaces such as the use of self-sensing concrete to detect traffic and the use of environmental smart self-cleaning photoment and smart light-generating concrete, as well as applications in Interior spaces such as smart cup products and modified smart vases with smart responses.

### Keywords:

Smart Materials- Ceramics Product - Sustainability