Study Of Ceramic Materials: Processing, Joining And Applications

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Abstract- *Ceramic materials are interpreted to mean thermally stable inorganic and non-metallic materials. This paper classifies the types, forming processes of ceramics, etc . The second part centers on properties and applications, and discusses both structural and functional ceramics, including bio ceramics. The branches of ceramic materials in the field of advanced ceramics*

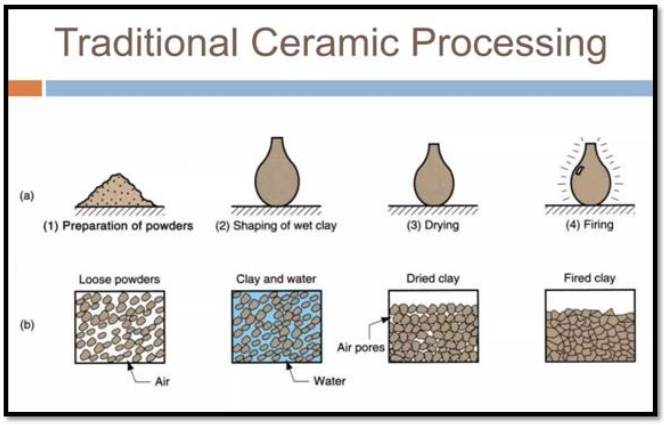
Ceramics form an important part of material groups. The growth of grade-appropriate joining methods to self-bond hard ceramics or for bonding ceramic to metals has been a major target, aiming at cutting edge applications of ceramics such as engine components and advanced gas turbines. When bonding ceramics, the main trouble is to get an intimate contact between the materials to be joined and when joining dissimilar materials and specially ceramics to metals, the main concern is the development of high residual stresses in the considered materials. Today a range of joining methods has been developed for joining ceramic to ceramic or ceramic to metal. In this paper processing, joining and application of ceramic materials in various fields are discussed.

I. PROCESSING

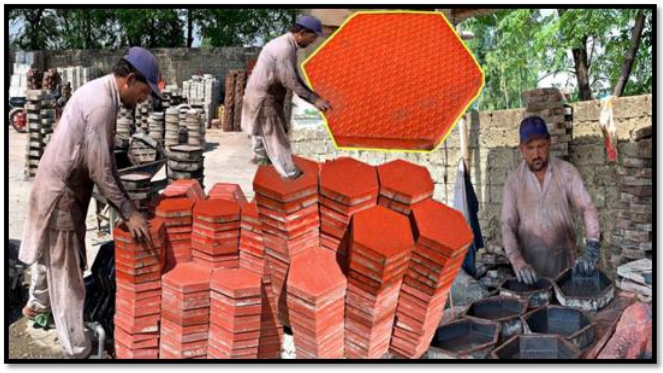
A ceramic is any of the various hard, brittle, heat-resistant, and corrosion-resistant materials made by shaping and then firing an inorganic, non-metallic material, such as clay, at a high temperature. Common examples are earthenware, porcelain, and brick.

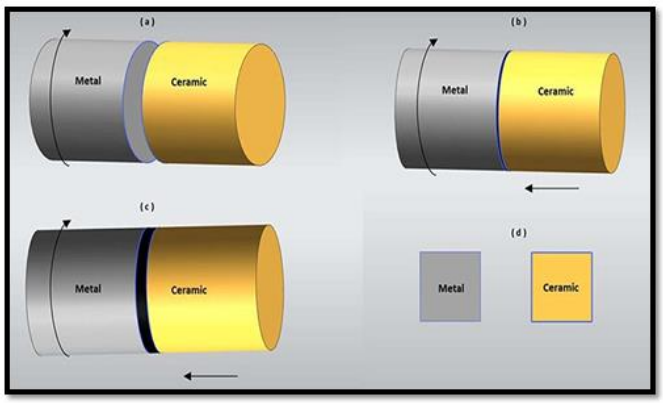
Some of the most common forming methods for ceramics include extrusion, slip casting, pressing, tape casting and injection moulding. After the particles are formed, these "green" ceramics undergo a heat-treatment (called firing or sintering) to produce a rigid, finished product

.in the above diagram, the first step is the preparation of raw material. It is in the form of loose powder with air spaces between them. The second step is the shaping of wet clay, and it consists of clay and water. The third process is drying, and it consists of dried clay. The next step is where the firing takes place.



SLIP CASTING-PROCESS





II. CONCLUSION

Ceramic materials have wide range of applications in the field of engineering, medical, industry and aerospace. Ceramics are also used to make objects as diverse as spark plugs, fibre optics, artificial joints, space shuttle tiles, cook tops, race car brakes, micro positioned, chemical sensors, self-lubricating bearings, body Armor, and skis. Ceramics and glass are beneficial in the kitchen for cooking, storing, and serving food. The finest tableware and cookware are made from porcelain. Wineglasses,

To conclude, ceramics are a diverse group of materials with an extensive range of physical and chemical properties that make them useful in many different applications.

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