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Simulation of Jewelry Forming Processes Using Smart Materials

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Abstract:

Jewelry is a passion of a large segment of children, especially females, which inspires the jewelry designer to direct this passion to raise a generation of young jewelry designers, using the combination of the arts of jewelry design and formulation and the science of smart materials. Smart materials are one of the most important fruits of technological development, and they vary between shape memory materials, color-changing materials, light-sensitive materials, and others sensitive to electricity. Given that jewelry design is one of the most important fields that affect the culture and thinking of the recipient, and based on the major role of shaping processes in enriching jewelry design, the interest in this research was in studying smart materials as a result of advanced technological developments and the possibility of employing them in simulating some jewelry shaping processes, so that this simulation would be the nucleus of a project to raise the young designer. The problem of the research is the scarcity of the use of smart materials in children's jewelry, and the lack of diversity of shaping methods in jewelry crafting collections directed at children. The research aims to build a knowledge base about smart materials, and employ these materials in simulating jewelry shaping processes. The importance of the research lies in its attempt to benefit from smart materials as a result of advanced technological developments in simulating some jewelry forming processes, with the aim of raising the child practicing this simulation as a young designer. Through the descriptive analytical approach, the research concluded that there are multiple types of smart materials, including shape memory materials, color changing materials, and materials sensitive to pressure and electricity. Through the experimental approach, the research concluded that some smart materials can be developed to suit children's practices.

Main Results:

1-.sing smart materials to simulate some jewelry formation processes.
2. Using smart materials leads to diversifying the forming methods in jewelry collections directed at children.
3. Shape memory polymer can be employed to simulate the process of forming ceramic jewelry.
4. Simulating the process of forming jewelry with wires using nitinol wires.
5. Simulating the process of inlaying jewelry with micromosaics using glow-in-the-dark lobes and (UV Resin)
6. The possibility of simulating the process of thermal forming glass jewelry through luminous thermal beads
7. Employing smart materials to simulate some jewelry forming processes makes them suitable for children's practices in middle childhood.
8. The high flexibility of nitinol wires weakens the stability of their formations.
9. Developing nitinol wire by combining it with another aluminum wire of the same thickness.
10. Nitinol wires combined with colored aluminum wires have an attractive surface appearance for children in addition to the ability to stabilize the formation.

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