

of material are bonded during the injection molding process. However, any other manufacturing method suitable to combine two types of material may be used. The first and second portions 210 and 220 may alternatively be assembled in a post-manufacturing process. For example, the first portion 210 and the second portion 220 may be manufactured independently and then bonded together using adhesive, heat treatment, ultra-sonic bonding, oxygen plasma surface treatment, or any other techniques known to one skilled in the art. However, any other suitable manufacturing method may be used. Additionally, similar to the first variation of the second preferred embodiment, the layer 110 may include a plurality of first and second portions 210 and 220 to create a desired shape for the deformation of the particular region 113.

[0043] In a second variation of the third preferred embodiment, as shown in FIGS. 18a, 18b, 19, and 20, the layer 110 is preferably made of a base material 230 and includes a modifier material 232 that changes the pliability properties of the layer no (for example, lower pliability). The modifier material 232 preferably changes the pliability of the base material 230 by providing a physical structure that mechanically interacts with and affects the pliability of the base material, for example, by providing a scaffold or a support structure across the base material 230 and decreasing pliability in locations of the layer 110 which include the modifier material 232. In a second example, the modifier material 232 may change the pliability of the base material 230 by chemically interacting with the base material, for example, the modifier material 232 chemically reacts with the base material 230 to form a third material of lower pliability than the base material. The chemical reaction preferably occurs during the manufacturing process, but may alternatively occur post-manufacturing, for example, the user may activate the reaction electrically or mechanically. However, the modifier material 232 may modify the pliability of the base material 230 in any other suitable manner. In a first example of the modifier material 232, the modifier material 232 is embedded into a first portion 210 of the layer 110, decreasing the pliability at the first portion 210, and a second portion 220 that includes only the base material. Alternatively, the modifier material 232 may be embedded into the second portion 220 of the layer 110 to increase pliability and the first portion 210 is without the modifier material 232.

[0044] In the second example of the modifier material 232, the modifier material 232 may include a secondary material 234 and a tertiary material 236, as shown in FIG. 19, where the combination of the secondary material and the tertiary material changes the pliability properties of the layer 110. The secondary material 234 may be arranged lengthwise along the layer 110 and the tertiary material 236 may be arranged widthwise along the layer 110 and secondary and tertiary materials 234 and 236 overlap at an intersection 235. At the locations where the secondary and tertiary materials 234 and 236 overlap, the secondary material 234 and the tertiary material 236 combine to form an area of different pliability characteristics (for example, higher pliability). In the example as shown in FIG. 19, the intersection 235 is located within the particular region 113 and forms a second portion 220 of increased pliability, but the intersection 235 may alternatively form a first portion 210 of decreased pliability. Alternatively, the second example of the modifier material 232 may be of a material type that changes pliability in a direct relationship with the amount of material present, for example, a material where the thickness of the material

determines pliability. Similar to the variation of the modifier that includes a secondary material 234 and a tertiary material 236, a portion of the modifier material 232 may be arranged lengthwise along a the layer 110 and a second portion of the modifier material 232 may be arranged widthwise along the layer 110 wherein the first and second portions of the modifier material 232 overlap at an intersection 235. At the locations where the first and second portions overlap, a region with a substantially higher content of the modifier material 232 forms, changing the pliability characteristics of the region. In these variations of the second example of the modifier material 232, the region wherein the secondary and tertiary materials 234 and 236 are not combined or where the content of the modifier material 232 is lower may also have a different pliability characteristic from the base material. However, any other suitable arrangement of modifier material 232 may be used.

[0045] In a third example of the modifier material 232, the modifier material 232 may be the same material as the base material. In this variation, the pliability of the base material 230 may be adjusted when treated with a treatment such as heat treatment or ultraviolet treatment. For example, the polymer chains of a polymer based base material 230 may cross link when exposed to ultraviolet light, thus decreasing the pliability of the cross linked portions of the base material 230. To obtain the effect of a first portion 210 with less pliability and a second portion 220 with higher pliability, during production a mask may be placed over the second portion 220 prior to an ultraviolet treatment. As a result, the regions without the mask will become first portions 210 with lower pliability and the regions with the mask will remain relatively more pliable. After the ultraviolet treatment, the base material 230 may be coated to prevent further cross-linking of the polymer chains when exposed to ultraviolet light. However, any other suitable method may be used to adjust the pliability of particular portions of a base material 230 with adjustable pliability.

[0046] The modifier material 232 may be of a material substantially similar to the base material 230 (e.g., a polymer of a second type embedded into a polymer of a first type) or may alternatively be of a material substantially dissimilar from the base material 230 (e.g., a metallic material embedded into a polymer material). In the variation of the modifier material 232 that includes a secondary material and a tertiary material, the secondary and tertiary materials may be of a material substantially similar or identical to each other and/or the base material. Alternatively, the secondary, tertiary, and base materials may be of substantially different types of materials. The modifier material 232 may be arranged into a variety of patterns and/or geometries, such as a lattice structure (as shown in FIG. 20), a plate structure, a plurality of strips, a ring structure, a plurality of concentric rings, a hexagonal structure, a rectangular structure, or any other suitable structure to control the shape of the deformation of the particular surface 113. A plurality of modifier material 232 may also be embedded at different levels within the thickness of the layer 110. The embedded modifier material 232 preferably functions to decrease the overall pliability of the first portion 210, allowing the first portion 210 to effectively act as a material with lower pliability than the second portion 220, substantially biasing the particular region 113 to deform at a higher degree in the second portion 220 than at the first portion 210.