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(54) Title: TWO-DIMENSIONAL AMORPHOUS CARBON COATING AND METHODS OF GROWING AND DIFFERENTIATING STEM CELLS

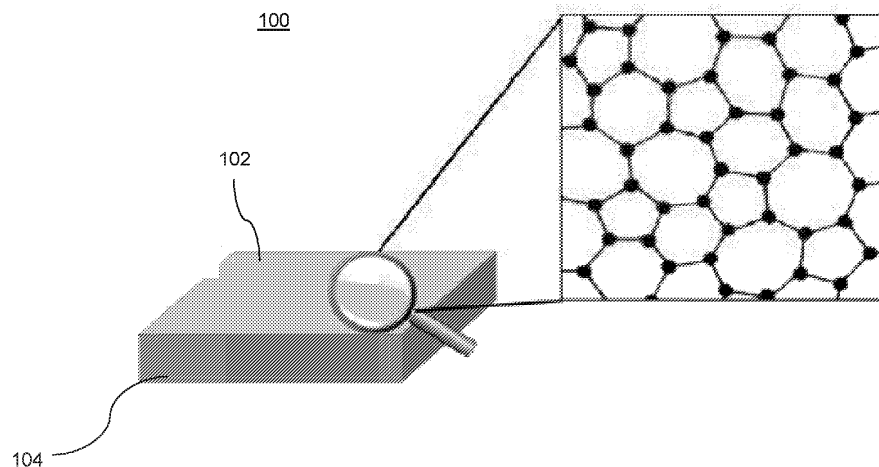


FIG. 1

(57) Abstract: Described is a composite material composed of an atomically thin (single layer) amorphous carbon disposed on top of a substrate (metal, glass, oxides); an article formed thereof and method of forming the article, comprising decomposing a carbon-containing gas (i.e. methane) to generate at least one decomposed species; and forming the 2D amorphous carbon (2DAC) film on the surface of the substrate. The 2DAC film can be used as a coating having an atomic structure consisting of non-hexagonal and hexagonal carbon rings, having a ratio of the hexagonal carbon rings to the non-hexagonal carbon rings is less than 1.0, wherein the coating is an implant coating. The present disclosure also provides a method of growing and differentiating stem cells, comprising disposing a seed layer on the surface of the substrate coated with 2DAC; and absorbing growth factors in a stem cell medium onto the surface of the substrate coated with 2DAC.

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