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(54) Title: BIOMIMETIC MATERIALS COMPRISING POLYHEDRAL OLIGOMERIC SILSESQUOXANES

(57) Abstract: Nanostructured chemicals such as polyhedral oligomeric silsesquioxanes, polyhedral oligomeric silicates, and polyhedral oligomeric metallasesquioxanes are attached to living and nonliving systems as biomaterials to provide a nanoscopic topology that favors biomimetic function and cellular modulation. The resulting surface is nanoscopically thin, nanoscopically dispersed, provides systematic chemistry, surface area, surface volume, surface topology, and is essentially free of impurities, and has controllable properties through selection of composition, R groups, nanostructure size and topology. Highly shape specific and chemically tailorable nanostructured molecules are sized to biological material dimensions and are compatible with all sterilization methods.

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