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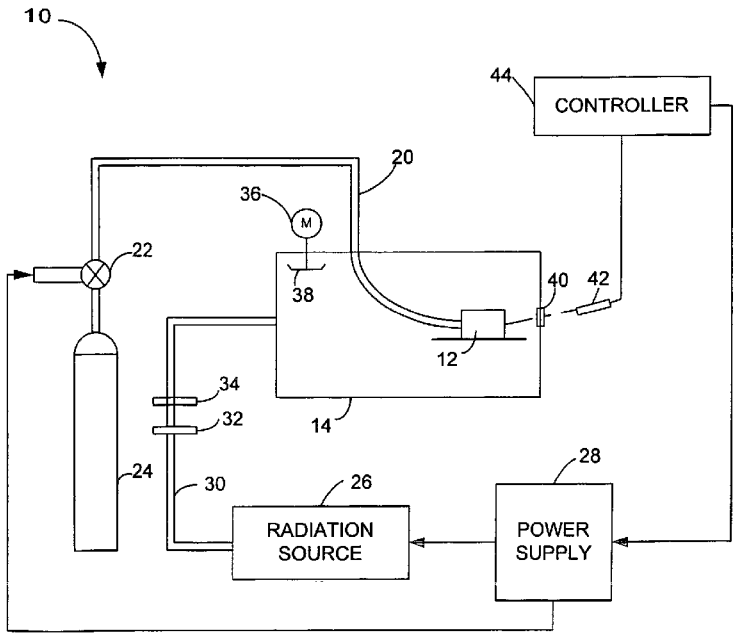
(54) Title: PLASMA CATALYST



(57) Abstract: Methods and apparatus are provided for igniting, modulating, and sustaining a plasma for various plasma processes and treatments. In one embodiment, a plasma is ignited by subjecting a gas in a multi-mode processing cavity to electromagnetic radiation having a frequency between about 1MHz and about 333 GHz in the presence of a plasma, which may be passive or active. A passive plasma catalyst may include, for example, any object capable of inducing a plasma by deforming a local electric field. An active plasma catalyst can include any particle or high energy wave packet capable of transferring a sufficient amount of energy to a gaseous atom or molecule to remove at least one electron from the gaseous atom or molecule, in the presence of electromagnetic radiation.

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