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Weiss

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(54) **SYSTEM AND METHOD FOR BIOLOGICAL APPLICATIONS USING PRE-DETERMINED SIZED NANOPARTICLES**

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See application file for complete search history.

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(57) **ABSTRACT**

The invention features an apparatus for producing a fluid stream having plurality of nanoparticles in the fluid stream. The apparatus includes a source configured to provide a fluid stream having a first randomly sized distribution of a plurality of nanoparticles; a flow control zone configured to receive the fluid stream from the source and to control the fluid stream to produce a controlled fluid stream having a selected flow rate; a separation zone configured to receive and to separate the selectively controlled fluid stream into at least one separated fluid stream having a non-randomly sized distribution of nanoparticles; and a collection zone capable of receiving the separated fluid stream according to at least one non-random sized distribution of nanoparticles to produce at least one collected stream. The apparatus is configured for a continuous flow of the fluid stream. A size of a nanoparticle can be related to an intrinsic core diameter, a hydrodynamic diameter, and a combination of intrinsic core diameter and hydrodynamic diameter measurements. The nanoparticles can include non-magnetic nanoparticles, partially magnetic nanoparticles, magnetic nanoparticles, superparamagnetic nanoparticles, and a combination of at least two different nanoparticle types. The invention also features methods for producing said fluid streams. The
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