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(54) **DEVICE AND METHOD FOR FOCUSING SOLUTES IN AN ELECTRIC FIELD GRADIENT**

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(58) **Field of Search** 204/450, 600, 204/465, 615, 547, 548, 550, 551, 643, 644, 647, 648; 210/656, 657, 658, 659, 198.2; 73/61.53, 61.54, 61.55, 61.56, 61.57, 61.58

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(57) **ABSTRACT**

An electrophoretic device and method for focusing a charged solute is disclosed. The device includes a first chamber for receiving a fluid medium, the first chamber having an inlet for introducing a first liquid to the chamber and an outlet for exiting the first liquid from the chamber; a second chamber comprising an electrode array, the second chamber having an inlet for introducing a second liquid to the chamber and an outlet for exiting the second liquid from the chamber; and a porous material separating the first and second chambers. The device's electrode array includes a plurality of electrodes and generates an electric field gradient profile which can be dynamically controlled. In the method, a charged solute is introduced into a fluid medium followed by the application of a hydrodynamic force. Opposing the hydrodynamic force with an electric field gradient results in solute focusing in the fluid medium. The electric field gradient is generated by an electrode array by individually adjusting the electrode voltages.

44 Claims, 30 Drawing Sheets

