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(54) **MICROFLUIDIC DEVICES FOR HIGH GRADIENT MAGNETIC SEPARATION**

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(57) **ABSTRACT**

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The present invention provides microfluidic devices that can be used to effect a number of manipulations on a sample to ultimately result in target analyte detection or quantification. The device provides at least one magnetic microchannel that is capable of separating magnetic or magnetically-labeled target analytes from non-magnetic materials. Further, a magnetic microchannel may sort materials according to their magnetic response. Alternatively, magnetic or magnetically-labeled components other than the target analytes can be retained by the magnetic microchannel and are thus removed from the target analytes. Depending on the specificity of the binding ligand, one can either separate a vast population of analytes sharing a common binding motif, or specifically retain a rare target analyte because of its recognition of a specific ligand on the magnetic particle.

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