allow for the removal of the sample fluid. However, the fixed-field magnets used in conventional magnetic sample plate applications are not capable of achieving robust mixing. For example, the magnetic particles generally tend to aggregate and cluster in discrete areas of the sample wells. The magnetic particles move with the liquid through small turbulent areas when using traditional mixing methods, thus making mixing inefficient. In addition, the plate itself must be moved between steps of the analysis, which requires significant automation.

BRIEF SUMMARY

[0004] Accordingly, a need exists to improve the overall speed and efficiency of sample mixing and separation using magnetic particles, including ultra-fast homogenous mixing of sample fluids. A need also exists for magnetic particles that have a high response to external magnetic fields as well as a low remanence. Furthermore, a need exists for the magnetic particles to remain suspended for a given time after mixing. A need also exists for a mixing method that mixes the magnetic particles through the liquid rather than with the liquid.

[0005] Examples of the invention address these and other challenges, individually and collectively.

[0006] A first aspect of the present invention relates to a magnetic particle for processing a sample solution. The magnetic particle comprises a magnetic material having a maximum field strength in a range of from about 20 emu/g to about 250 emu/g and a remanence in a range of from about 0 emu/g to about 30 emu/g. The magnetic particle further comprises a ligand attached to an outer surface of the magnetic particle. The ligand interacts with an analyte of interest in the sample solution.

[0007] Another aspect relates to a method of processing a sample. The method includes providing a magnetic particle having a ligand attached to an outer surface of the particle. The ligand interacts with an analyte of interest in the sample. The magnetic particle has a maximum field strength in a range of from about 20 emu/g to about 250 emu/g and a remanence in a range of from about 0 emu/g to about 30 emu/g. The method further includes contacting a solution comprising the analyte of interest with the magnetic particle to allow the ligand to interact with the analyte of interest.

[0008] Another aspect relates to a method for processing a sample. First, a container comprising ferrimagnetic particles and a sample is provided. The