Summary of the Invention:

The invention disclosed herein provides an improved magnetic particle/ procedure that overcomes the problem seen with current magnetic particles: significant losses of desired cells following a purging step to remove undesired cells. In a preferred embodiment of the invention dense/magnetic nickel particles are used to remove undesired cell populations using multiple rounds of depletion if needed but yielding a desired cell population in close to 100% yield. The invention is well suited for manufacturing procedures related to cell therapies such as CAR T cell therapies but not limited thereto. Cell therapies such as CAR T cell therapies require a number of steps in the preparation of the CAR T cells that are used to treat a cancer patient. As a result of multiple steps involved it is inevitable that cell losses will occur at each step. For steps that require depletion of cells using magnetic particles, the particles of the invention disclosed here do not result in the loss of desired cells thus leading to a significant improvement over existing technology. An improvement that will further enable the improved manufacture of cell-based therapies used to treat malignancies such as leukemias/lymphomas and solid tumors. The particles of the invention are composed of solid metal. As a result of this sterilization of the particles, an absolute requirement for a therapeutic application, is straight forward compared to magnetic particles of the art composed of iron oxides. The particles, prior to the addition of reactants to the metal surface, are simply heated to 250 degrees centigrade for the appropriate time to sterilize the particles.

Brief Descriptions of Drawings:

Figure 1. Particles of the invention were used to demonstrate a key feature of the disclosed invention: that depletion/purging of an undesired cell population results in almost quantitative recovery of non-depleted cells. In this experiment 3.5micron particles bound with the reactant mouse-anti-human CD8 were used to perform 6 rounds of purging resulting in no significant loss of the desired CD4 cells.

Figure 2. The table demonstrates improved recoveries of non-targeted, desired cells compared to the competition