CLAIMS

1. A method of chemically-mechanically polishing a substrate, which method comprises: (i) providing a substrate, (ii) providing a polishing pad, (iii) providing a polishing composition comprising: (a) about 0.001 wt. % to about 10 wt. % of aluminate-modified silica particles, (b) about 1 ppm to about 1000 ppm of a polyacrylamide, wherein the polyacrylamide has a molecular weight of about 500 g/mol to about 15,000 g/mol, (c) optionally, a heterocyclic film-forming agent, and (d) water, wherein the polishing composition has a pH of about 1 to about 3, and wherein the polishing composition further comprises about 0.1 wt. % to about 2 wt. % of a chelating agent, wherein the chelating agent is selected from the group consisting of glycine and alanine, (iv) contacting a surface of the substrate with the polishing pad and the polishing composition, and (v) abrading at least a portion of the surface of the substrate to remove at least a portion of the surface of the substrate to polish the surface of the substrate, wherein the substrate comprises at least one layer of nickel-phosphorous, and wherein abrading at least a portion of the surface of the substrate removes at least some nickel-phosphorous from the surface of the substrate to polish the surface of the substrate.

2. The method of claim 1, wherein the aluminate-modified silica particles are silica particles treated with an aluminum salt and potassium hydroxide.

3. The method of claim 1, wherein the aluminate-modified silica particles in the polishing composition have a maximum in a particle size distribution of from about 5 nm to about 60 nm.

4. The method of claim 1, wherein the polishing composition comprises about 50 ppm to about 500 ppm of the polyacrylamide.

5. The method of claim 1, wherein the heterocyclic film-forming agent is present and is benzotriazole.

6. The method of claim 5, wherein the polishing composition comprises about 10 ppm to about 100 ppm of benzotriazole.

7. The method of claim 1, wherein the substrate is a nickel-phosphorous coated aluminum memory disk.