Chapter 12
Summary

Field responsive fluids, i.e., MR fluid, ER fluid, and ferrofluid, have the ability to change from liquid to semi-solid form, and vice versa, in the presence or absence of externally applied magnetic fields or electric fields. In fact, these fluids present an exhilarating and, sometimes, complex behavior that can be turned upon the application of an externally applied field. These fluids have matured as several barriers have been overcome over the last few decades. These fluids have been the subject of scientific inquires and long-standing technology. They paved their own way much faster than expected into relatively high-volume products in markets, industries, and technologies. These materials, for example in automotive devices, are subjected to environmental working conditions like temperature variations, changing road conditions, high shear stress, etc., and imposes a diverse life which challenges performance requirements. With this regard, the main constituents of the field responsive fluids, i.e., magnetic particles, carrier fluid, and stabilizer, as well as their characteristics, should be carefully considered depending on their aim and application. As a result, efforts toward new formulation of these fluids are still required for achieving best condition, e.g., durability, and low sedimentation of magnetic particles as well as low associated cost.

A. Hajalilou et al., *Field Responsive Fluids as Smart Materials*,
Engineering Materials, DOI 10.1007/978-981-10-2495-5_12