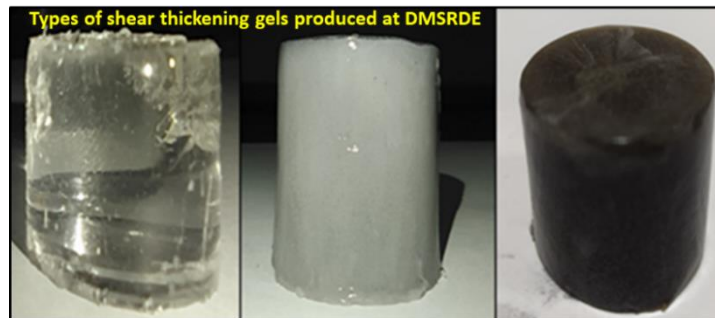


## Processing and Material Technologies of Shear Thickening Gel Based Nanocomposites for Impact Resistant Applications

- Shear thickening fluid (STF) is the non-Newton fluid which increases its viscosity when shear rate exceeds a critical value. In most often, rate of increase of viscosity is slow in STF which is one of the major challenges for its application in dissipation of kinetic energy during impact
- Shear Thickening Gel (STG) shows more stable performance and it is easier to store compared to its fluidic form which helps to overcome the problems of particle sedimentation and liquid volatilization
- By optimizing the bonding and non-bonding interactions in the polymeric nanocomposite gels, DMSRDE has prepared unique SSG which shows the change in viscosity as a function of shear force and holds a great promise for damping and shock energy dissipation
- Flexible gel filled polymeric scaffolds/laminated composites have been prepared for efficient absorption of low to medium velocity impact



Prototype of flexible STG filled laminates have been prepared and tested for ballistic impact applications. The shear thickening mechanism resulted to efficient dissipation of energy by rearrangement of functional nanofillers due to squeezing out of polymeric matrix from the nanoparticle agglomerates which ultimately resulted into thickening of gel.

The composite structure possesses efficient dissipation of impact energies for development of dampers, shock absorption for gun recoil system, fortified bunkers or ballistic/blast impact personal protection system, anti-piercing shoe sole, stab resistant protective gear, blast/fire protection of Li ion batteries and Flexible self-powered triboelectric nanogenerator (TENG) etc.