CLAIMS:

1. A method of reducing the surface roughness of an additive manufactured (AM) article or material comprising:

a. providing a lubricant composition comprising a lubricant fluid in combination with at least one surface reactive component,

b. providing a performed AM article or material having a first surface roughness;

c. applying the lubricant composition to the performed AM material after the AM process; and

d. applying a load to the lubricated performed AM article or material during its intended operation, wherein the lubricant composition reduces the surface roughness of the lubricated performed AM article or material resulting in a second surface roughness that is less than the first surface roughness.

2. The method of claim 1, where the article or material has an initial roughness of at least 0.1 μm.

3. The method of claim 1, wherein the surface reactive component comprises at least one member selected from the group consisting of a friction modifier, friction reducer, anti-corrosion additive, antiwear additive, viscosity modifier, extreme pressure additive, dispersant, detergent, antioxidant, anticorrosive additive, and combinations thereof.

4. The method of claim 3, wherein the surface reactive component comprises at least one of an antiwear additive, a friction modifier or a combination thereof.

5. The method of claim 4, wherein the friction modifier is a metal-containing friction modifier.

6. The method of claim 4, wherein the friction modifier is an organic friction modifier.

7. The method of claim 3, wherein the antiwear additive comprises a member selected from the group consisting of a metal-containing dialkyl dithiophosphate, metal-containing antiwear additive, metal-free antiwear additive, metal stearate, ashless phosphate, dithiocarbamate, sulfur-containing antiwear additives, sulfur-phosphorus-containing additives, carboxylates, carboxylate salts, and a combination thereof.

8. The method of claim 7, wherein the antiwear additive is ZDDP.

9. The method of claim 7, wherein the antiwear additive is TCP.

10. The method of claim 7, wherein the antiwear additive is TPPT.

11. The method of claim 5, wherein the metal-containing friction modifier comprises at least one effective metal or metalloid selected from the group consisting of Al, Ba, Bi, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mo, Na, Ni, P, Si, Sn, Ti, W, Zn, Zr, Y, rare earth metals, and combinations thereof.

12. The method of claim 11, wherein the effective metal comprises at least one of Mo, P, Zn, or a combination thereof.

13. The method of claim 6, wherein the organic friction modifier comprises at least one member selected from the group consisting of glycerol monooleates, alkoxylated alcohols, stearyl ethers, fatty acid-based esters, fatty acid-based amides, carboxylates, salicylates, polymeric esters, oxygen-containing friction modifiers, polyalkylene glycols, and combinations thereof.

14. The method of claim 1, wherein the lubricant fluid comprises at least one of a mineral, synthetic, or natural fluid of lubricating viscosity.

15. The method of claim 14, wherein the lubricant fluid comprises a member selected from the group consisting of hydrogenated polyalphaolefin (PAO), Group V base stock, Group II base stock, Group III base stock, and a combination thereof.

16. The method of claim 1, wherein the article material comprises at least one of a metal, an alloy, cermet, ceramic, a non-metal, a polymer, a resin, a coating, or a combination thereof.

17. The method of claim 16, wherein the alloy comprises a member selected from the group consisting of austenitic stainless steels, duplex steels, tool steels (& maraging steels), low alloy steels, cobalt alloys, nickel alloys, copper alloys, bismuth alloys, titanium alloys, rare earth element type alloys, MCrAlY alloys, aluminum alloys, tin alloys, bronze alloys, and combinations thereof.

18. The method of claim 1, wherein the load is from 0.5 MPa to 2 GPa pressure.

19. The method of claim 1, wherein the load is a frictional force.

20. The method of claim 19, wherein the frictional force is due to sliding of a surface of the article or material relative to another surface.

21. The method of claim 1, wherein the load is applied under lubrication conditions wherein the temperature is from 20° C to 200° C.

22. The method of claim 19, wherein the load is applied under lubrication conditions of a mean sliding speed is from 5 mm/s to 5000 mm/s.

23. The method of claim 19, wherein the load is applied under lubrication conditions wherein the sliding is from 5% slide-to-roll ratio to 100% sliding.

24. The method of claim 1, wherein the load is applied under conditions of from 0.01 GPa to 2 GPa pressure, from 50° C to 200° C, a mean speed of from 50 mm/s to 500 mm/s, and from 5% to 250% slide-to-roll ratio (SRR).

25. The method of claim 1, wherein the first surface roughness is reduced by at least 1%.

26. The method of claim 1, wherein the first surface roughness is reduced by at least 10%.

27. The method of claim 1, wherein the second surface roughness, Rq, is ≤ 8 μm.

28. The method of claim 1, wherein the additive manufactured article or material is a 3D printed article or material.

29. The method of claim 1, wherein the AM article or material is a component of a machine, device or system including an internal combustion engine, a power train, a driveline, a transmission, a gear, a gear train, a gear set, a compressor, a pump, a hydraulic system, a bearing, a bearing race, a bushing, a turbine, a mechanical device, an electro-mechanical device, an electrical device, a hydraulic device, a hybrid device, a steering rack, a transmission, a fuel injector, camshaft lobe, hydraulic cylinder rod, a disc, a piston, piston ring, a cylinder liner, a cylinder, a cylinder rod, a cam, a tappet, a lifter, a bearing, a journal, a roller, a needle roller, a sharpening stone, a tapered, a needle, a ball, a valve or a combination thereof.

30. The method of claim 29, wherein the engine includes a combustion engine.

31. A method of reducing the surface roughness of an additive manufactured (AM) engine component comprising:

a. providing an engine including a preformed AM component having a first surface roughness;

b. applying a lubricant composition to the engine including the preformed AM component, wherein the lubricant composition comprises a lubricant fluid in combination with at least one surface active component; and

c. operating the engine thereby applying a frictional force to the lubricated preformed additive manufactured component during its intended operation,

wherein the lubricant composition reduces the surface roughness of the AM component resulting in a second surface roughness that is less than the first surface roughness.

32. A method of screening surface finishing lubricant compositions comprising the steps of:

a. providing a lubricant composition comprising a lubricant fluid in combination with at least one surface reactive component,

b. providing a preformed AM article or material having a first surface roughness;

c. applying the lubricant composition to the preformed AM article or material after the AM process; and

d. applying a load to the lubricated preformed AM article or material during its intended operation,

wherein the lubricant composition reduces the surface roughness of the AM article or material resulting in a second surface roughness that is less than the first surface roughness.

33. A method of reducing the surface roughness of a 3D printed article or material comprising:

a. providing a lubricant composition comprising a lubricant fluid in combination with at least one surface reactive component,

b. providing a preformed 3D printed article or material having a first surface roughness;

c. applying the lubricant composition to the preformed 3D printed material after the 3D printing process; and

d. applying a load to the lubricated preformed 3D printed article or material during its intended operation,

wherein the lubricant composition reduces the surface roughness of the 3D printed article or material resulting in a second surface roughness that is less than the first surface roughness.