

Novel *IF*-WS₂ Dispersed Particle Performance in Metalworking Fluid Applications

CATEGORY OR KEYWORDS

Dispersed *IF*-WS₂ spherical particles use as friction reducer, anti-wear, extreme pressure, filing surface crack and shock absorber behavior in lubricant application

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INTRODUCTION

Inorganic fullerene like tungsten disulfide (*IF*-WS₂) particles are known to be high performing friction reducer, anti-wear and extreme pressure additive for various lubricant applications. They are not only suitable for conventional lubrication conditions rather can be used in extremely harsh conditions such as high/low temperature, high pressure and high shock. Performance of the particles depends on size, shape and concentration as well as surface chemistry. Proper surface engineering of the *IF*-WS₂ particles using appropriate surfactants/dispersion chemistry is important for stability and performance of particles in polar and nonpolar media. We have develop high concentration *IF*-WS₂ particle dispersions in polar and nonpolar media. The current work present that *IF*-WS₂ base fluid that significantly improve the lubricity, anti-wear and extreme pressure properties of MQL, drawing fluid, forging fluid, synthetic and semi-synthetic metalworking fluids. Our extended experiments further showed that particles not only improve the tribological properties and cooling efficiency rather it reduces the corrosive properties of water. A systematic studies on anti-corrosion performance of particles was conducted. There is ongoing research to explore the additional properties of *IF*-WS₂ particle along with tribological properties.