

Argonne's Graphene/Nanodiamond Tribology Intellectual Property

Title	Benefits	U.S. Patent/Patent App. No.	ANL Invention
Superlubricating Graphene Films	<ul style="list-style-type: none"> • Easy to apply using spray process in air • Easily scalable to large area • Cost effective, eliminates hazardous waste • Virtually eliminates friction and wear 	13/553,484 filed July 19, 2012	IN-12-069 & IN-11-056
Superlubricating Graphene and Graphene Oxide Films	<ul style="list-style-type: none"> • Easy to apply using spray process in air • Easily scalable to large area • Cost effective, eliminates hazardous waste • Virtually eliminates friction and wear • Works in dry and humid environment 	9,890,345 issued on February 13, 2018, 14/415,499 filed January 16, 2015 (claiming priority to the above)	IN-11-056
Low Friction Wear Resistant Graphene Films	<ul style="list-style-type: none"> • Superlubricity in dry atmosphere with no measurable wear for extended time • Near zero friction when used in dry atmosphere 	9,561,526 issued February 7, 2017; 15/408,137 filed January 17, 2017	IN-14-027 & IN-14-029

Low Friction and Wear Resistant Graphene Films	<ul style="list-style-type: none"> • Superlubricity in dry atmosphere with no measurable wear for extended time 	Non-provisional patent application filed February 9, 2017	IN-15-147, IN-15-130 & IN-15-131
Advanced oxidation process for the exfoliation of two dimensional materials	<ul style="list-style-type: none"> • Simple method to mass-produce graphene and other 2D materials in solution 	16/054,868 filed August 3, 2018	ANL-IN-18-006

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