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**Horia Hulubei National Institute for  
R&D in Physics and Nuclear  
Engineering**

**LUBRICATING AND WEARPROOFING  
COMPOUND BASED ON WOLFRAM  
BISULPHIDE AND CARBON**

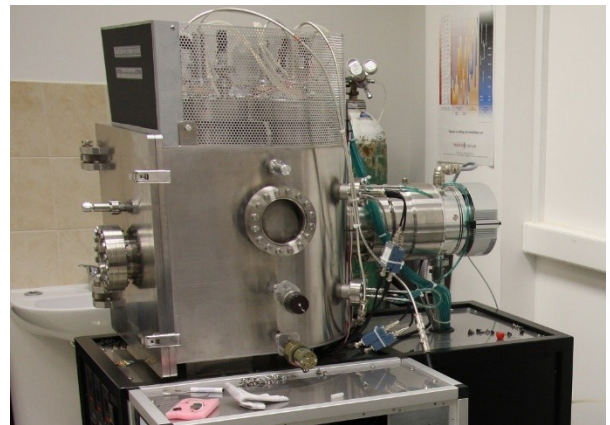
**Patent Number: RO 127962/30.06.2011**

**Abstract**

The invention relates to a method for vacuum coating metal parts with lubricating and wear proof dry thin layers from a WS<sub>2</sub> + C compound, using sputtering methods of the magnetron or ionized magnetron type or cathode arc evaporation, with a view to reducing the static and dynamic friction coefficients of the working surfaces thereof. According to the invention, the method consists in coating the surfaces of metal parts by using the simultaneous sputtering of WS<sub>2</sub> and of carbon/graphite, from two independent sputtering targets placed on two magnetron-type sputtering devices, where the total thickness of the coating layers is higher than 0.5 μm. The coating layer claimed by the invention consists of WS<sub>2</sub> and carbon/graphite, having a single layer-type structure with a constant or gradual composition from 100% to 0% carbon, or a multilayer-type structure with various compositions and thicknesses of the intermediate layers, the multiple thin layers with super-lattice structures having thicknesses in the range of 2...10 nm.

**Technology stage**

The product was tested and the technology is proved on a small scale. The patent is ready for licensing.



**Applications**

Industrial applications

**Advantages**

The patent uses the advantages of tungsten disulphide multilayers super lattice by comparison to the molybdenum disulphide widely used now.

- Better adherence to the substrate
- Stronger hardness and therefore higher allowed weights
- High temperature resistance
- Lower friction coefficient at higher humidity
- Longer lifetime

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