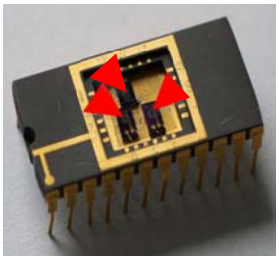
Technology Licensing Opportunity

TMDs Quantum dots

Market Opportunity



The global quantum dots market was $610 million in 2016 and it is estimated to grow to $3.4 billion by 2021 with a compound annual growth rate of 41.3% from 2016 to 2021. Semiconducting transition metals dichalogenides (TMDs) nanomaterials form the key nanoelectronic components in nanoelectronics. As the dimensions are important characteristics when designs are in the nanoscale, obtaining the raw nanomaterials with specific parameters becomes paramount in the manufacturing of future chips built on nanoelectronics concepts. Thus obtaining these nanomaterials at industrial scale can quickly become one of the bottlenecks in nanoelectronics based chips in the future. Current transition metals dichalogenides nanomaterials are made from the top down methods; processing from bulk mm scale large crystal to nanomaterials dimensions using physical means like milling and exfoliation. To process from millimeter scale to nanometer scale is too tedious, expensive and of too low size quality to be industrially relevant. Moreover, since top down approaches will necessitate the abundance of those bulk crystals of the specific TMD in the earth's crust in the first place; this may not be the case with our bottom-up approach.

Technology

Our technology describes a bottom-up approach to produce TMDs quantum dots of consistent sizes (depending on the TMDs, the sizes ranges between 3-10nm) and can produce rare TMDs or TMDs that do not exist in nature and therefore impossible to obtain from mineral ore top down production. We could also engineer atomic defects into the crystal lattice of the same TMDs QDs as part of the bottom up synthesis approach. Scalability can be up to hundreds of grams.

Category

Advanced materials

Stage of Development

TRL4

Applications

- Biology and biomedicine
- Computing and memory
- Electronics and displays
- Optoelectronic devices
- Optical components in telecommunications and image sensors
- Security applications
- Solar power applications

Advantages

- Cheap
- Fast
- Highly scalable
- Full control on the transition metal with the chalogenides

Status

Available for research collaboration and licensing

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