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**Passivation of CdSe Quantum Dots by Graphene and MoS<sub>2</sub> Monolayer Encapsulation** DATONG ZHANG, DENNIS ZI-REN WANG, RICHARD C. CRESWELL, Columbia University, CHENGUANG LU, National Center for Nanoscience and Technology, IRVING P. HERMAN, Columbia University — The encapsulation of a monolayer of CdSe quantum dots (QDs) by one-to-three layer graphene and MoS<sub>2</sub> sheets protects the QDs from oxidation. Photoluminescence (PL) from the QD cores shows a much slower decrease in core diameter over time due to slower oxidation in regions where the QDs are covered by van der Waals (vdW) layers than in those where they are not, for chips stored both in the dark and in the presence of light. PL mapping shows that the CdSe QDs under the central part of the vdW sheet age slower than those near its edges, because oxidation of the covered QDs is limited by transport of oxygen from the edges of the vdW sheets and not transport across the vdW layers. This encapsulation effect is also tested with other environments. Preliminary results show that vdW materials could be promising candidates for nano-coating materials for devices operating in extreme environments.

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