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Evidence of the metal-insulator transition in ultrathin V2O3 films

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We report on the strain state and transport properties of V2O3 single layers and V2O3/Cr2O3 bilayers deposited by Molecular Beam Epitaxy on (0001)-Al2O3 substrates. We find that the metal-insulator transition is strongly attenuated in V2O3 layers of 6 and 4 nm grown coherently on Al2O3. This is in contrast with V2O3 layers grown on Cr2O3 buffer layers which exhibit a metal-insulator transition. Our results provide evidence for the existence of a metal-insulator transition in ultra-thin films. These findings are relevant for the understanding of V2O3 properties in the proximity of interfaces and integration of correlated electron systems in devices.

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