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# The microstructures and electrical properties of Y-doped amorphous vanadium oxide thin films

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## ABSTRACT:

One of promising approaches for further improving the sensitivity of microbolometer arrays with greatly-reduced pixel size is using the thermal-sensitive materials with higher performance. In this paper, Y-doped vanadium oxide ( $\text{VO}_x$ ) thin films prepared by a reactively sputtering process exhibit enhanced performance for the microbolometer application compared with frequently-applied  $\text{VO}_x$  thin films. Both undoped and Y-doped  $\text{VO}_x$  thin films are amorphous due to the relatively low deposition temperature. Y-doped  $\text{VO}_x$  thin films exhibit smoother surface morphology than  $\text{VO}_x$  due to the restrained expansion of particles during depositions. Y-doping increases the temperature coefficient of resistivity by over 20 % for the doping level of 1.30 at%. The change rate of resistivity, after aging for 72 hours, of thin films was reduced from about 15 % for undoped  $\text{VO}_x$  to 2 % due to the introduction of Y. Moreover, Y-doped  $\text{VO}_x$  thin films have a low 1/f noise level as  $\text{VO}_x$  ones. Y-doping provides an attractive approach for preparing  $\text{VO}_x$  thermal-sensitive materials with

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