

**VANADIUM DIOXIDE BASED FABRY-PEROT EMITTER FOR DYNAMIC  
RADIATIVE COOLING APPLICATIONS**

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**ABSTRACT.** An asymmetric Fabry-Perot emitter is proposed with a lossless dielectric spacer sandwiched between a vanadium dioxide ( $\text{VO}_2$ ) thin film and an opaque aluminum substrate. Switchable mid-infrared emittance has been achieved due to the insulator-to-metal transition of  $\text{VO}_2$ . When  $\text{VO}_2$  is dielectric below 341 K, the structure is highly reflective, whereas a Fabry-Perot resonance cavity is formed with high broadband emissivity at 10  $\mu\text{m}$  when  $\text{VO}_2$  becomes metallic above 345 K. The radiative properties are calculated via a uniaxial transfer matrix method and Bruggeman effective medium theory. This study will facilitate novel applications in building and spacecraft radiative cooling.