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White light emission from engineered silicon carbide

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Silicon carbide (SiC) is a wide indirect bandgap semiconductor. The light emission efficiency is low in nature. But this material has very unique physical properties like good thermal conductivity, high break down field etc in addition to its abundance. Therefore it is interesting to engineer its light emission property so that to take fully potential applications of this material. In this talk, two methods, i.e. doping SiC heavily by donor-acceptor pairs and making SiC porous are introduced to make light emission from SiC. By co-doping SiC with nitrogen and boron heavily, strong yellow emission is demonstrated. After optimizing the passivation conditions, strong blue-green emission from porous SiC is demonstrated as well. When combining the yellow emission from co-doped SiC and blue-green from porous SiC, a high color rendering index white light source is achieved.