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Broadband light generation in CVD single crystal diamond MIAOCHAN ZHI, KAI WANG, ALEXEI SOKOLOV, Dept. of Physics, Texas A&M University, ULTRAFAST TEAM — We study broadband light generation in Raman-active crystals, such as diamond, aiming to produce few-femtosecond and sub-femtosecond pulses. Diamond has high Raman gain and has the widest transparency range of all materials. We generated up to 16 sidebands (wavelength down to 550 nm) when we focus two pump beams into a high optical quality chemical vapor deposition (CVD) single crystal diamond with 1 mm thickness. The two 50 femtosecond pump pulses have peak wavelength at 1237 and 1040 nm and have about 5μJ pulse energy. The first and 2^{nd} frequency up-converted sidebands have pulse energy of 0.31 and 0.15 μJ. The pump pulse at 1040 nm has a conversion efficiency of 23% to the sidebands. The peak frequency of the sidebands has a linear dependence on the external output angle. We combine the sidebands using a spherical mirror and a fused silica prism. A nice round beam is obtained after the prism. Our next step will be to use our pulse shaper to adjust the relative phases of the sidebands and characterize the pulses synthesized.

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