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AC Excited Si Microplasma Channel Devices: Photon amplification through microchannels TAEK LIM KIM, EUNG SOO KIM, EFRAIN MEJIA, SUNG-JIN PARK, JAMES GARY EDEN, Optical Physics and Engineering Laboratory — In this presentation, we report the design and performance of ac-excited Si micro-plasma "V-grooved" channel devices. These Si channels have been fabricated by anisotropic etching and the width of the channels ranges from 50 to 100 microns and the length ranges from 2 to 5 cm. The V-grooved microchannel generates and confines stable microdischarge in Ne or Ar gas pressures above 400 Torr with the ac excitation of 20 kHz. Radiative intensity from the microplasma is dependent on the channel length, gas pressure and direction. The ratio of photon flux at the transverse and the vertical direction is about 10:1. Furthermore, strong infrared wavelength transitions from Ne or Ar/Xe gas mixtures were also observed at the transverse direction through the microchannel. The optical amplification and radiative efficiency through these devices are characterized with the function of microchannel geometry and dimension.

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