

# Raman random lasing – extremely high conversion efficiency and temperature dependence

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The selection of the pumping mode, along with an increase in the radiation intensity at low temperatures can greatly improve efficiency of the random Raman lasing effect in disordered Raman media by more than an order of magnitude. Maximum Stimulated Raman Scattering (SRS) conversion efficiency in barium nitrate powder reached 30 percent at liquid nitrogen temperature for picosecond excitation. The transport mean free path of light in the disordered Raman active medium under investigation was estimated to be 5.4 m by the method of coherent backscattering. Temporal characteristics of incident and passed through the sample pump pulses, 1st, 2nd and anti-Stokes components of SRS were investigated. The detected effect of the pump energy influence on the delay time of the first Stokes component can be used for measuring the nonlinear parameters of the medium. The transformation of the first Stokes component spectrum while decreasing the temperature till the liquid nitrogen temperature at the picosecond excitation was registered.