Most of the fluorescent pH probes work near neutral or acidic regions of the pH scale. In this work, the long wavelength excitable BCDA dye (9-butyl-bis-3-(4-(dimethylamino) phenyl) allylidene)-9H-carbazole-3,6-diamine, \( \lambda_{ex} = 590 \text{ nm} \) has been investigated for pH sensing in the alkaline region. Absorption and emission based spectral data, quantum yield, fluorescence lifetime, photostability and acidity constant (pKa) of the dye was determined in conventional solvents and in Ethyl cellulose (EC). Chemical structure of the exploited dye was shown in Figure 1.

The EC based sensing nanomaterials were fabricated by electrospinning that the most convenient way to make a nano-scale continuous polymer uses a high static voltage to draw the fiber from a liquid polymer. Sensor was based on the change in the fluorescence signal intensity of employed ionophore. Response of the BCDA was fully reversible within the dynamic working range. The response times were between 4–14 min. A relative signal change of 95% and 96% have been achieved for sensor dyes of BCDA.

Figure 1: BCDA: 9-butyl-bis-3-(4-(dimethylamino)phenyl)allylidene)-9H-carbazole-3,6-diamine dye.

KEYWORDS: optical nanosensors, electrospinning, fluorescence, fiber optics