Flame front structure characteristics of turbulent premixed flames including the local radius of curvature, fractal inner cutoff scale and local flame angle have been calculated from the experimental OH-PLIF images of CH$_4$/air flames and those diluted with CO$_2$ and superheated H$_2$O at 0.5 MPa and 573 K. The convex and concave structure of the flame front was detected and statistical analysis including PDF and ADF of local radius of curvature and local flame angle was conducted. Results showed that the flame front of turbulent premixed flames at high pressure and high temperature is wrinkled flame front with small scale convex and concave cusps superimposed with large scale branches, while the whole flame front tends to be convex to unburned mixture. The effect of EGR gases dilution on the flame front structure of turbulent premixed flames is predominated by CO$_2$ other than H$_2$O dilution. The quantitative flame front characteristics reveal the complicated effect of CO$_2$ dilution on turbulent premixed flames characteristics observed in our previous research. In the case of CO$_2$ dilution, some local wrinkled structure becomes sharp and propagating deeply into the burned mixture, resulting in the decrease of fractal inner cutoff scale, formation of a thick flame brush and the enlargement of the mean flame volume, while the overall wrinkled scale increases significantly due to the suppression of concave structure with CO$_2$ dilution, leading to the decrease of turbulent flame front area, and subsequently to the decrease of $S_f/S_L$. 

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