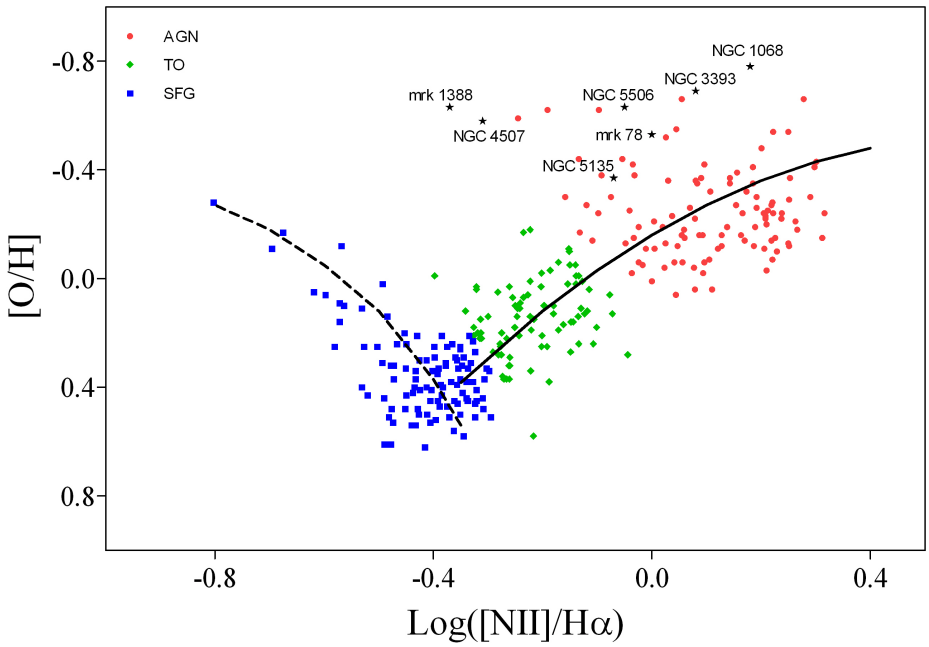

Fig. 15. Metallicity calibrated diagnostic diagram. The two empirical relations (equations 3 and 4) are also traced over the data. Also shown are Sy2 galaxies from the literature for comparison. The color figure can be viewed online.

Only the low metallicity solutions reported by Nagao et al. (2006) for their objects are consistent with our model. Surprisingly, the differences observed are not systematic, suggesting that other physical parameters (e.g., shocks, as we mentioned before, or special geometries, like an ionization cone or an obscuring torus) could also be important in these galaxies.

The above comparison suggests that the uncertainty in our metallicities is of the order of 0.3 dex, increasing to as much as 0.5 dex in some Sy2 like Mrk 1388. However, this galaxy appears to be an extreme case, for which we do not expect our calibration to apply. In Figure 15, most of the AGNs and TOs in our sample fall in a different regime than the AGNs from the literature used for the test (that is, the AGN in our sample fall in a different part of the diagnostic diagram, and they are clearly tracing a continuous relation). A better estimate of the uncertainty in the gas metallicities obtained with our method may be ∼0.2 dex, which is consistent with the variance of our fitted relation.

The gas metallicities as deduced from our calibration together with the B luminosities are presented in Table 8 for the AGNs, and in Table 9 for the TOs. In Figure 16 we show the box-whisker plots for the gas metallicities in galaxies having different activity types and different morphologies. The AGNs and TOs have lower gas metallicities than the SFGs and we find an excellent correlation with the morphological type of the galaxies, the metallicities increasing in the later types. The statistical tests (Table A1 and Table A2 in the Appendix) confirm the differences observed at a level of confidence of 99%.

In Figure 17 we compare the gas metallicities of the TOs and AGNs with those of the SFGs.

TABLE 8

EXAMPLES OF GAS METALLICITIES AND ABSOLUTE B MAGNITUDES OF AGNS[†]

Identification in SDSS	[O/H]	M_B
SDSS J113903.33−001221.6	−0.15	−18.06
SDSS J150654.85+001110.8	−0.16	−19.52
SDSS J113423.32−023145.5	−0.24	−19.75
SDSS J172613.73+620858.1	−0.19	−18.85
SDSS J173044.85+562107.1	−0.35	−19.25
SDSS J025017.75−083548.5	−0.20	−17.84
SDSS J032501.68−054444.8	−0.06	−18.25
SDSS J142757.71+625609.3	−0.22	−19.46
SDSS J114743.68+014934.3	−0.66	−19.12
SDSS J133548.24+025956.1	−0.36	−19.28

[†]Full table available in electronic form at `http://www.astroscu.unam.mx/rmaa/RMxAA..47-2/RMxAA..47-2_rcoziol-tables.zip/`.