Boundedness of Commutators on Hardy Spaces over Metric Measure Spaces of Non-homogeneous Type [*]

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Abstract. Let $(\mathcal{X}, d, \mu)$ be a metric measure space satisfying the so-called upper doubling condition and the geometrically doubling condition. Let T be a Calderón-Zygmund operator with kernel satisfying only the size condition and some Hörmander-type condition, and $b \in \widetilde{\mathrm{RBMO}}(\mu)$ (the regularized BMO space with the discrete coefficient). We establish the boundedness of the commutator $T_b := bT - Tb$ generated by T and b from the atomic Hardy space $\widetilde{H}^1(\mu)$ with the discrete coefficient into the weak Lebesgue space $L^{1,\infty}(\mu)$. The boundedness of the commutator generated by the generalized fractional integral T_α ($\alpha \in (0,1)$) and the $\widetilde{\mathrm{RBMO}}(\mu)$ function from $\widetilde{H}^1(\mu)$ into $L^{1/(1-\alpha),\infty}(\mu)$ is also presented. Moreover, by an interpolation theorem for sublinear operators, we also show that the commutator T_b is bounded on $L^p(\mu)$ for all $p \in (1, \infty)$.