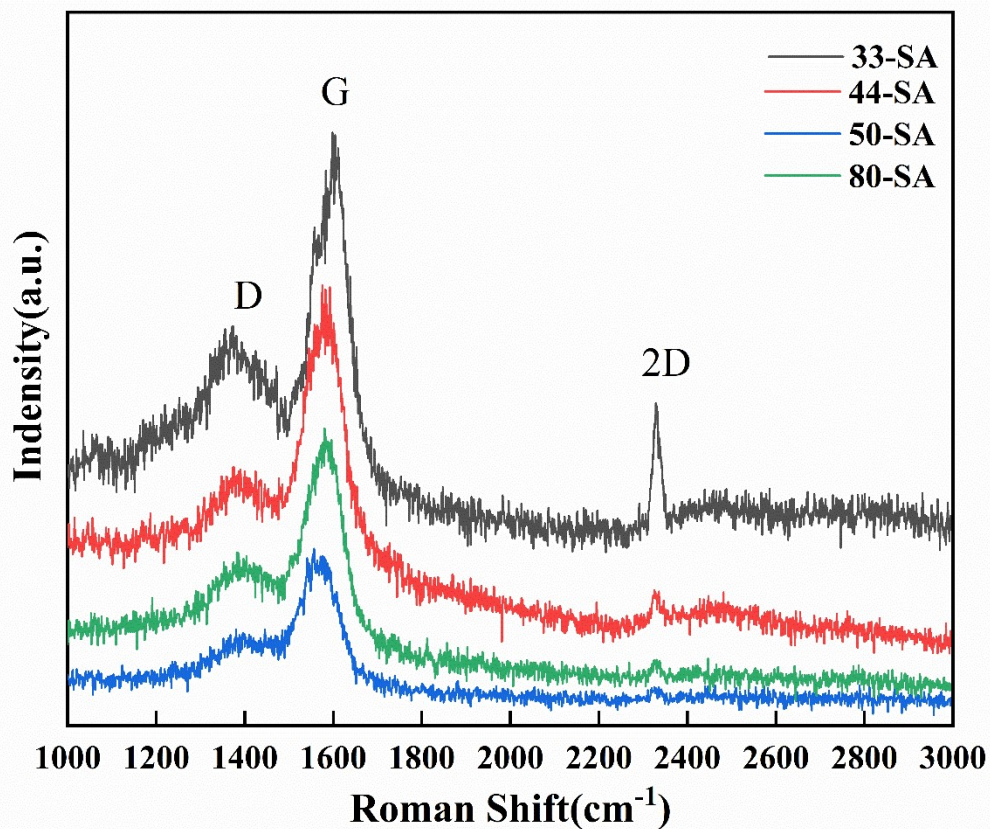


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Fig. S1 Pore size distribution of spent catalysts



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5

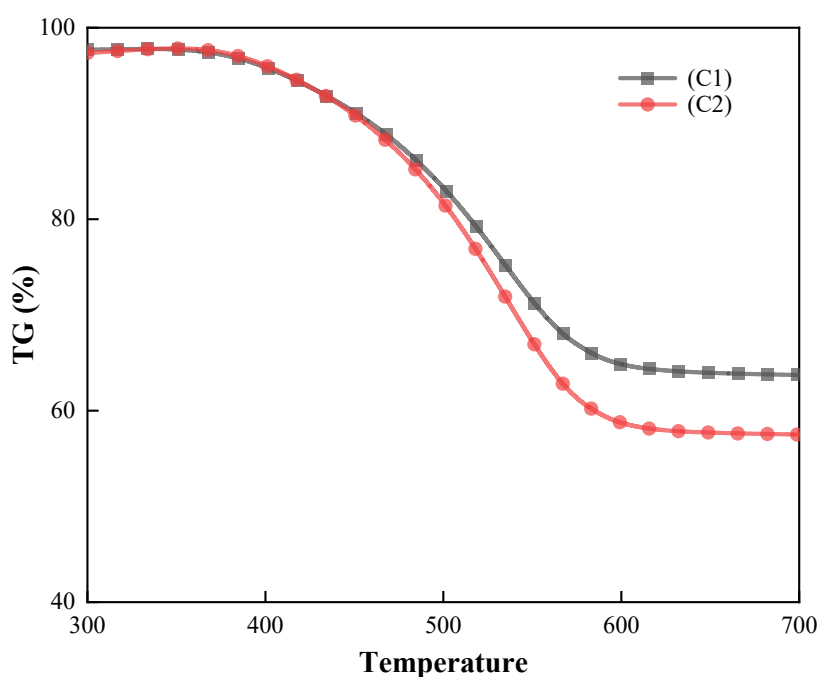
Fig.S2 Raman spectrum of spent catalysts

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7 Table. S1 Summary of the peaks and bands assignment.

Band name	Band position cm^{-1}	Description
$V_{\text{C-H}}$	1250–1270	C–H vibrations
D1	1360	“Breathing” vibrational mode of not-well-structured aromatics
D3	1450	Structural defects of aromatic clusters
G1	1575–1600	Assigned to in-plane stretching vibrational modes of well-structured aromatics
D2	1610	Attributed to disordered aromatic structures

8



9

Fig. S3 Catalyst TG curve in continuous use

10

11 Table.S2. Cyclability of catalysts

Cycle number	PMB and HMB Yield (%)
1	48.31%
2	13.64%

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