Table S1 Results of X-ray diffraction (XRD) analysis and scanning electron microscopy (SEM) observation on fossil corals. Subsamples with numbers are investigated for diagenesis screening, which correspond to skeletal portions with numbers in Figs. 3 and S1.

Sample ID	Subsample for diagenesis test*	XRD Aragonite (%)	Calcite (%)	SEM Secondary aragonite cement
Exp.310-9B-17R-1 (44-53 cm)	①	100.0	0.0	none
	②	100.0	0.0	*partially distributed*
	③	89.6	10.4	-
	④	80.5	19.5	-
	⑤	71.3	28.7	-
Exp.310-9D-25R-1 (65-75 cm)	①	100.0	0.0	none
	②	100.0	0.0	none
	③	100.0	0.0	none
	④	100.0	0.0	none
	⑤	100.0	0.0	none
	⑥	100.0	0.0	none
	⑦	100.0	0.0	none
	⑧	100.0	0.0	none
	⑨	95.3	4.7	*partially distributed*
Exp.310-9D-25R-2 (43-51 cm)	①	100.0	0.0	none
	②	100.0	0.0	none
	③	100.0	0.0	none
Exp.310-9D-25R-2 (51-57 cm)	①	100.0	0.0	none
	②	100.0	0.0	none
	③	100.0	0.0	none
	④	100.0	0.0	none
	⑤	100.0	0.0	*partially distributed*

*The subsample number corresponds to that in Figure DR2.
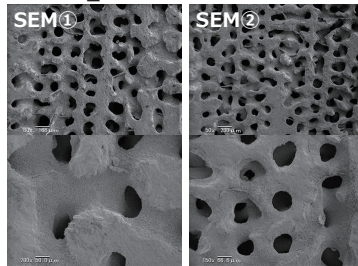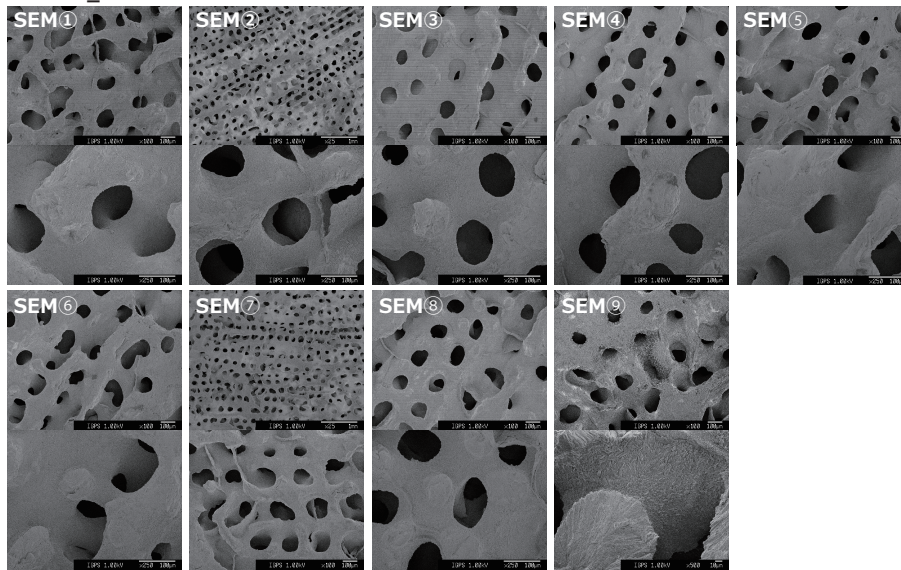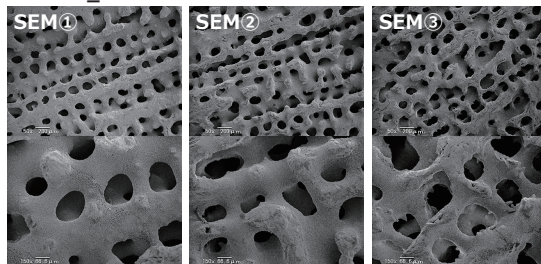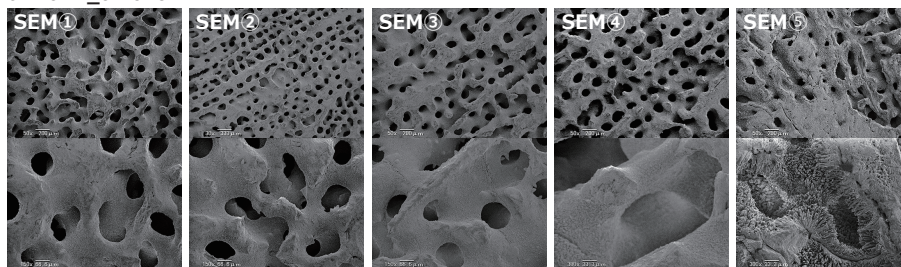
Figure S1. SEM images of coral skeleton from sample 310-9B-17R-1, 310-9D-25R-1, and 310-9D-25R-2. Numbers correspond to those of skeletal portions shown in Fig. 3.