Supporting Information

Characterization of dolomite and calcite microcalcifications in human breast tissue

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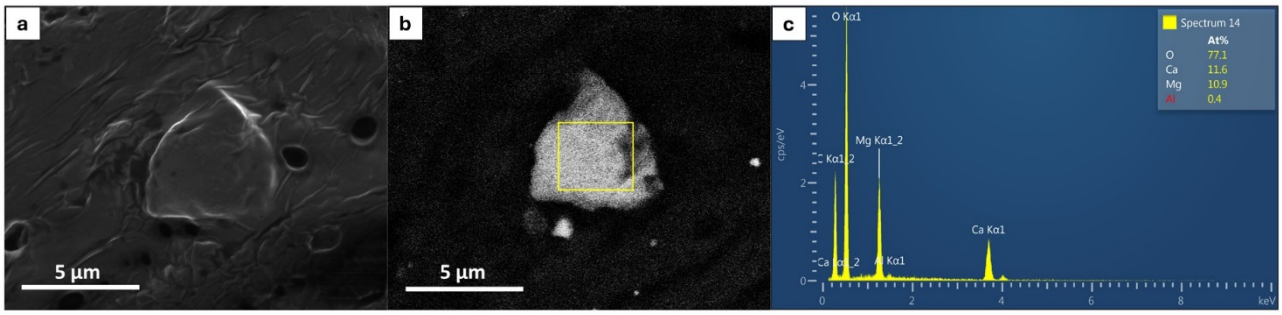

Figure S1. SEM image and EDS measurement of a single MC embedded in tumorous tissue of a patient with developed DCIS. (a) MC surface and surrounding tissue, imaged by secondary electron detection under low accelerating voltage (3 kV). (b) The same MC imaged by backscattered electron detection under high accelerating voltage (10 kV). The mineral particle is bright compared to the organic surroundings due to its high atomic number. (c) EDS analysis showing Ca and Mg atoms, and a lack of P atoms, indicating a non-CaP mineral. The Ca:Mg molar ratio is 1.06.

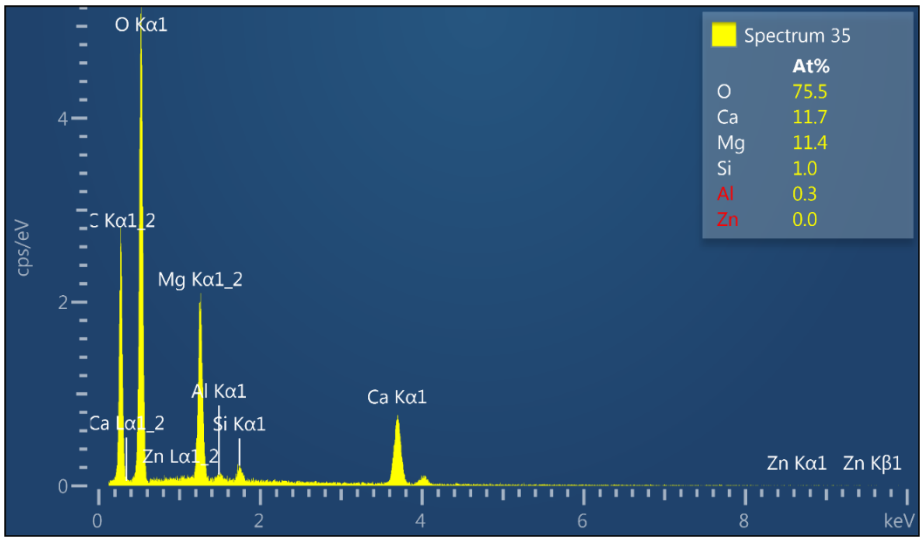

Figure S2. EDS measurements of the non-CaP MC shown in Fig. 4b.

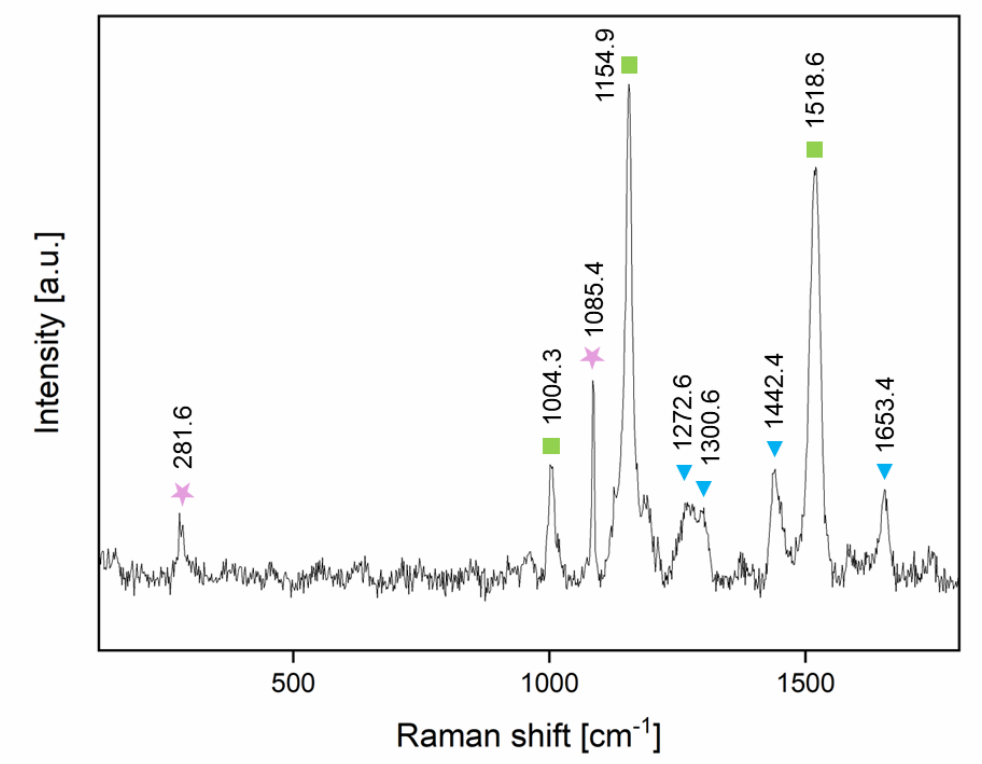

Figure S3. Raman spectrum of an MC with a 2.3 μm diameter, showing calcite and organic material. Green square: carotene, blue arrowheads: lipids, pink star: calcite.

Table S1. Partial Clinical Data of the Participating DCIS Patients.

patient number	age (y)	height (m)	weight (kg)	BMI (kg/m²)	smoking	procedure	collection date	clinical diagnosis and histologic type	tumor size (cm)	Status				KI67 mitotic rate	alive? (Dec. 2021)	outcome (Dec. 2021)
										ER	PR	HER2	BRCA			
Patient 1	37	1.55	56	23.3	No	mastectomy	July 2019	left breast carcinoma with DCIS	2.5	-	-	-	-	80%	yes	Nov. 2019 - recurrence. 09/2020- Right breast U.S.: BIRADS 2
Patient 2	56	1.68	80	28.3	No	lumpectomy (without lymph node excision) + open right hemicolectomy	Jan. 2018	ductal carcinoma, grade 3 + DCIS Carcinoma of colon	2.5	+	+	-	NA	intermediate	no	Treatment was given primarily for the colon disease. Metatstatic colon cancer to the liver, abdominal cavity and bone.
Patient 3	32	1.6	70	27.3	No	lumpectomy	Mar. 2014	breast carcinoma, DCIS + IDC3	2	+	+	+	-	NA	yes	NED
Patient 4	51	1.6	53	20.7	Yes	lumpectomy + sentinel lymph node dissection	Sept. 2016	IDC grade 2 + DCIS grade 3. Malignant neoplasm of the breast, unspecified	1.5	+	+	+	NA	20%	yes	NED
Patient 5	62	1.73	65	21.7	No	lumpectomy	Feb. 2017	nonextensive intermediate grade dcis	NA	+	+	NA	NA	NA	yes	NED
Patient 6	71	1.57	107	43.4	No	lumpectomy	Mar. 2020	DCIS grade 2. Malignant neoplasm of breast, unspecified	1	+	+	-	NA	3%	yes	NED

NED= no evidence of disease.

Table S2. Peak Locations for the Calcite, Mg-Calcite, and Dolomite Raman Spectra Presented in Figure 6.

crystal type	**peak center (cm^{-1})**
calcite MC	1085.4
commercial calcite	1085.7
biogenic Mg-calcite*	1086.6
synthetic Mg-calcite	1086.7
dolomite MC	1097.5
dolomite powder	1097.4

*From sea urchin tests