TABLE 1. Characteristics of the amber samples used in heat treatment experiments.

Sample code	Description	
JA	Golden specimen, rectangular and sub-angular in shape. Transparent, with a yellowish orange and fine-grained surface. The interior is clean, occasionally showing small silky and cloudy inclusions, a few tiny gas bubbles, and an apparent disc-shaped crack.	
JB	Beeswax-colored specimen, nearly trigonal to sub-triangular in shape, showing a color variation of golden yellow to milky white from the edge to the center. Transparent to opaque, exhibiting a brownish yellow and saccharoidal surface. The center shows smooth flow structure, gas bubbles, and a disc-shaped structure.	
JC	Beeswax-colored specimen. Slightly transparent to semitransparent, showing a brownish dendritic surface. The inside displays flow striations and clearly defined boundaries, with bubbles visible in cloudy inclusions.	
JD	Beeswax-colored specimen, nearly elliptical in shape. Slightly transparent to semitransparent, showing a brownish yellow dendritic surface. The inside displays smooth flow striations and bubbles.	
JE	Beeswax-colored specimen, nearly rectangular. Opaque, with a brownish yellow surface. The inside shows mottled or smooth distribution of light yellow and white veins with clearly defined boundaries.	
JF	Beeswax-colored specimen, nearly trigonal and sub-angular. Milky white, opaque, with a brownish yellow dendritic surface and flow structures inside.	

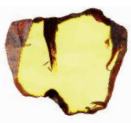
TABLE 2. General procedures for the heat treatment of amber.

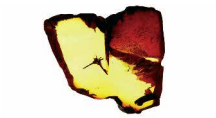
Stage	Description		
1. Preparation	Check the autoclave operation system. Determine operating parameters such as temperature, pressure, and atmosphere for heat treatment, based on thickness, size, and transparency of semi-finished and finished amber products.		
2. Dosing	Arrange the samples on an iron tray and place inside the autoclave. Close and tighten the cover and insert the sensor.		
3. Enhancement	Set the pressure, fill the autoclave with an inert gas (or oxygen) until the initial pressure is reached, and shut off the gas valve. Turn on the autoclave power supply and set the temperature, heating rate, and duration. After heating, the system will automatically shut off.		
4. Blowing-out	When the autoclave naturally cools down to about 40°C, shut off the power supply. Remove the temperature sensor, release the gas inside the stove, open the cover, and retrieve the specimens.		

TABLE 3. Enhancement parameters and characteristics of amber samples.

Sample	Before test	After test	Enhancement method(s) and parameters	Assessment
JA-3 (9.44 g)	Golden yellow 	Bicolored golden and red flower 	Purification, sparking Temperature: 200°C Time: 2.5 hours Pressure: 3.0 MPa Ambient medium: inert gas	The "sun spark" was small and only slightly visible.
JA-4 (8.94 g)	Golden yellow 	Red 	Purification, oxidation Temperature: 210°C Time: 3.0 hours Pressure: 4.5 MPa Ambient medium: inert gas + oxygen	The expected effect was achieved.
JA-5 (6.90 g)	Golden yellow 	Bicolored red and golden flower 	Purification, oxidation, sparking Temperature: 210°C Time: 3.0 hours Pressure: 4.5 MPa Ambient medium: inert gas + oxygen	The expected effect was achieved.
JB-2 (6.82 g)	White and golden yellow pearly beeswax 	Brownish yellow golden 	Purification Temperature: 200°C Time: 5.0 hours Pressure: 5.0 MPa Ambient medium: inert gas	The expected effect was largely achieved; only the right lower corner part was not completely transparent.
JB-4 (5.42 g)	White and golden yellow beeswax 	Blackish red 	Purification, oxidation Temperature: 210°C Time: 3.0 hours Pressure: 4.5 MPa Ambient medium: inert gas + oxygen	The expected effect was achieved.
JC-1 (6.58 g)	White and honey yellow beeswax 	Dark red 	Purification Temperature: 210°C Time: 6.0 hours Pressure: 5.5 MPa Ambient medium: inert gas	Ideal color was produced, but transparency was not ideal.
JC-2 (7.82 g)	White and honey yellow beeswax 	Red 	Purification, oxidation Temperature: 210°C Time: 3.0 hours Pressure: 4.5 MPa Ambient medium: inert gas + oxygen	The expected effect was achieved.
JC-3 (8.71 g)	White and honey yellow beeswax 	Golden with red flower 	Purification, sparking, oxidation Temperature: 200°C Time: 3.0 hours Pressure: 3.0 MPa Ambient medium: inert gas + oxygen	The expected effect was achieved, with the middle part showing attractive "sun spark" inclusions.

TABLE 3 (continued). Enhancement parameters and characteristics of amber samples.

Sample	Before test	After test	Enhancement method(s) and parameters	Assessment
JC-4 (8.78 g)	White and honey yellow beeswax 	Bright yellow golden 	Purification Temperature: 210°C Time: 6.0 hours Pressure: 5.5 MPa Ambient medium: inert gas	The expected effect was achieved, due to oxidation of the polished surface after three rounds of purification.
JC-7 (25.64 g)	White and honey yellow beeswax 	Pearly beeswax 	Purification Temperature: 200°C Time: 5.0 hours Pressure: 4.5 MPa Ambient medium: inert gas	The expected effect was achieved.
JD-2 (5.66 g)	Honey yellow beeswax 	Beeswax 	Beeswax baking Temperature: 60°C Time: 60 days Pressure: constant Ambient medium: air	The expected effect was achieved.
JD-3 (8.36 g)	Honey yellow beeswax 	Brownish yellow golden 	Purification Temperature: 210°C Time: 5.5 hours Pressure: 5.5 MPa Ambient medium: inert gas	The expected effect was achieved after three rounds of purification.
JD-4 (6.18 g)	Honey yellow beeswax 	Bright yellow golden 	Purification, sparking Temperature: 200°C Time: 3.0 hours Pressure: 3.0 MPa Ambient medium: inert gas	After three rounds of purification, the expected effect was achieved. The sparking test failed, as no “sun spark” inclusions were produced.
JD-5 (5.26 g)	Honey yellow beeswax 	Golden flower 	Purification, sparking Temperature: 200°C Time: 2.5 hours Pressure: 3.0 MPa Ambient medium: inert gas	The expected effect was achieved.
JD-6 (6.82 g)	Honey yellow beeswax 	Red 	Purification, oxidation Temperature: 210°C Time: 3.0 hours Pressure: 4.5 MPa Ambient medium: inert gas + oxygen	The expected effect was achieved.
JE-2 (11.50 g)	White and yellow beeswax 	Bright golden 	Purification Temperature: 210°C Time: 6.0 hours Pressure: 5.5 MPa Ambient medium: inert gas	After three rounds of purification and polishing of the oxidized surface, the expected effect was largely achieved, though cracks formed inside the amber.

Sample	Before test	After test	Enhancement method(s) and parameters	Assessment
JE-3 (11.25 g)	White and yellow beeswax 	Golden and red 	Purification, sparking, oxidation Temperature: 200°C Time: 3.0 hours Pressure: 4.0 MPa Ambient medium: inert gas + oxygen	The test failed, as no "sun spark" inclusions were produced.
JE-4 (13.87 g)	White and yellow beeswax 	Red flower 	Purification, sparking, oxidation Temperature: 200°C Time: 3.0 hours Pressure: 4.0 MPa Ambient medium: inert gas + oxygen	The test failed, as no "sun spark" inclusions were produced.
JE-5 (12.53 g)	White and yellow beeswax 	Golden flower 	Purification, sparking Temperature: about 200°C Time: 2.5 hours Pressure: Approx. 3.0 MPa Ambient medium: inert gas	Ideal "sun spark" inclusions were created after three rounds of purification.
JE-6 (12.00 g)	White and yellow beeswax 	Dull yellow beeswax 	Beeswax baking Temperature: 60°C Time: 90 days Pressure: constant Ambient medium: indoor open environment	The expected effect was achieved.
JF-1 (11.78 g)	Milky white beeswax 	Dark red 	Purification, oxidation Temperature: 210°C Time: 6.0 hours Pressure: 5.5 MPa Ambient medium: inert gas	After three rounds of purification, red color resulted from slow oxidation, but the transparency was not ideal.
JF-2 (9.76 g)	Milky white beeswax 	Golden 	Purification Temperature: 200°C Time: 5.0 hours Pressure: 5.0 MPa Ambient medium: inert gas	After three cycles of purification, the transparency was not noticeably improved.
JF-3 (7.45 g)	Milky white beeswax 	Red 	Purification, oxidation Temperature: 210°C Time: 3.0 hours Pressure: 4.5 MPa Ambient medium: inert gas + oxygen	The expected effect was largely achieved.