

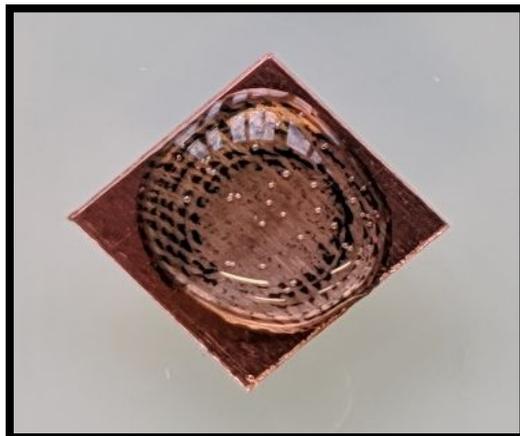
# **Developed Latent Fingerprints via Aryldiazonium Tetrachloroaurate Salts on Copper Surfaces: An XPS Study**

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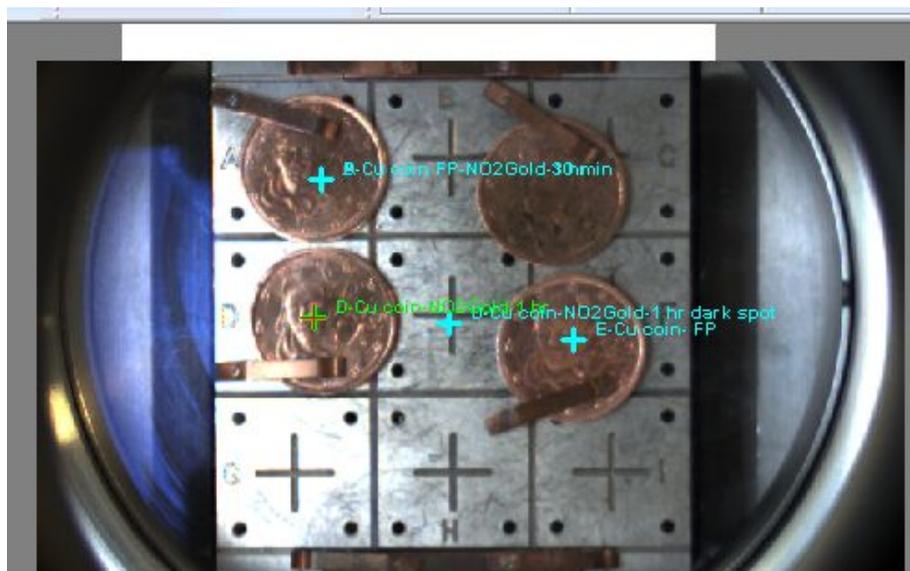
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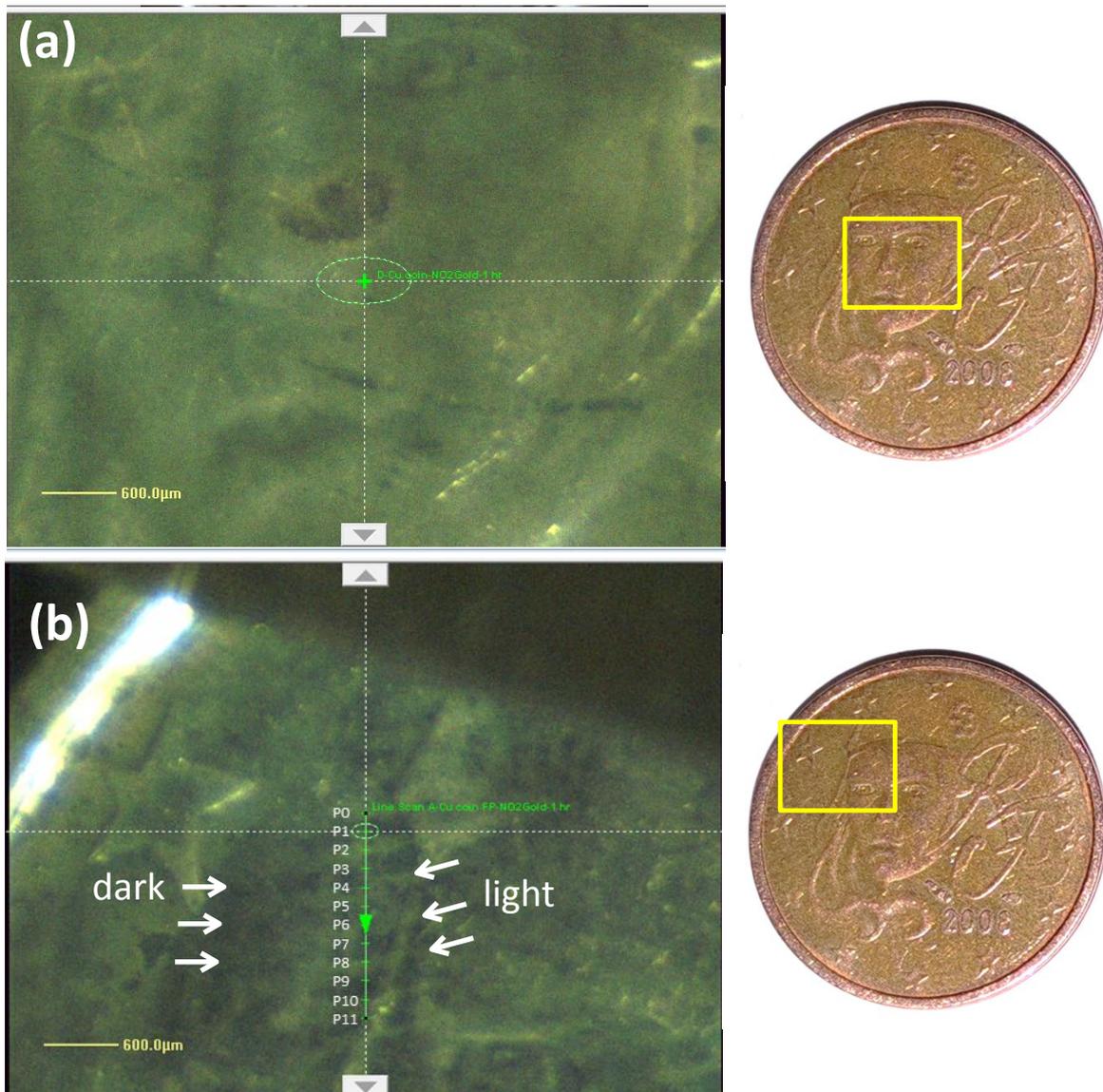
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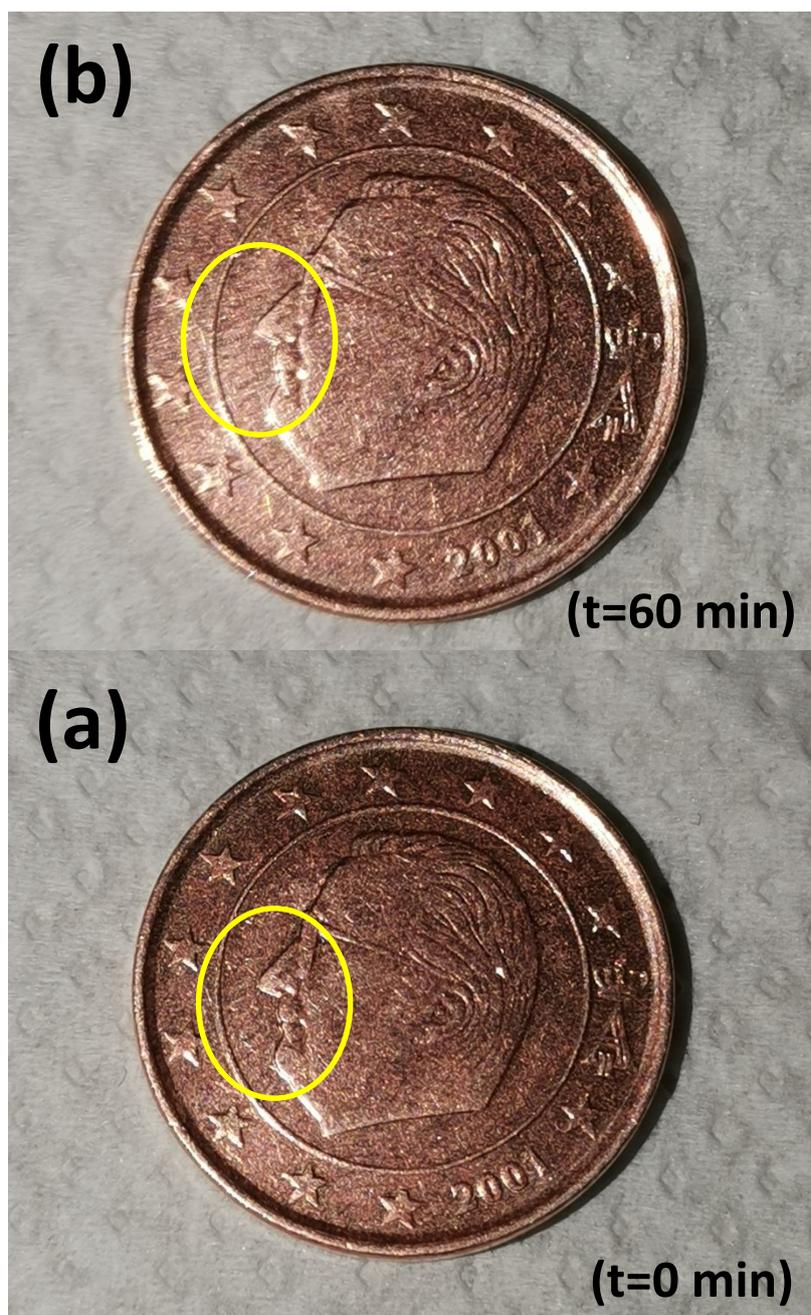
**Figure S1.** Latent fingerprint demonstration using aryldiazonium tetrachloroaurate solution. After washing and drying the dark (positive) and light (negative) regions of the fingerprint were analyzed by XPS using microfocussed X-ray beam. For the sake of clarity, the concept is shown on a flat copper surface and not on a copper coin.



**Figure S2.** XPS sample holder with clipped 2 euro cent coins.



**Figure S3.** The obverse side of the 2 euro cent. Yellow rectangles indicate the parts caught by the CCD camera of the XPS machine. (a) The face shows a dark spot resulting from the reaction of the diazonium with copper. (b) The flat part of the obverse side of the coin was easier to analyze by XPS because the fingerprints were placed on a featureless part.



**Figure S4.** Attempt to visualize fingerprint on the obverse side of the 1 euro cent without any aryldiazonium tetrachloroaurate solution: (a) at  $t=0$  min, right after the coin has been fingerprinted; (b) after 60 min. The yellow circle indicates the part of the coin where the fingerprint was placed.

**Table S1.** Peak table showcasing the distinct atomic percentage of 4-O<sub>2</sub>NC<sub>6</sub>H<sub>4</sub>N<sub>2</sub><sup>+</sup>AuCl<sub>4</sub><sup>-</sup>.

Position	-N=N- %	NO <sub>2</sub> %	Cu 2p%	Au 4f%
1	24.9	40.6	10.3	24.2
2	25.9	43.3	7.64	23.1
3	23.5	41.5	6.27	2889
4	29.3	36.60	9.62	24.5
5	28.8	40.7	6.40	24.1
6	30.5	36.1	7.50	25.9
7	27.2	45.5	7.87	19.4
8	23.0	48.0	6.58	15.4
9	28.5	53.6	6.43	11.5
10	25.7	58.6	4.35	11.4
11	27.2	44.0	6.56	22.2
12	25.5	40.0	6.45	28.1

**Table S2.** Tabular representation of XPS data of fingerprint and NO<sub>2</sub>-aryldiazonium-AuCl<sub>4</sub> treated copper sheet (Top). Relative concentrations of Cu(0) and Cu(II) species present on the surface (Bottom).

	<b>Name</b>	<b>Peak BE</b>	<b>Area (P) (cps.eV)</b>	<b>Atomic %</b>
P1L	Au 4d	335.24	18408.79	6.53
	Cu A	571.45	67384.45	-
	Cu 2p <sub>1/2</sub>	952.54	35810.45	-
	Cu 2p <sub>1/2</sub> B	954.64	5431.56	-
	Cu 2p <sub>3/2</sub>	932.78	85071.73	55.43
	Cu 2p <sub>3/2</sub> B	934.81	4958.46	3.24
	Cu 2p <sub>3/2</sub> (shake-up)	943.81	3077.42	2.03
	-N=N-	399.58	5182.53	20.94
	NO <sub>2</sub>	405.58	2915.85	11.82
P2D	Au4d	335.31	15831.73	5.23
	Cu A	570.66	73957.56	-
	Cu 2p <sub>1/2</sub>	952.32	32838.13	-
	Cu 2p <sub>1/2</sub> B	954.53	5808.21	-
	Cu 2p <sub>3/2</sub>	932.52	73831.58	44.8
	Cu 2p <sub>3/2</sub> B	934.39	10503.08	6.39
	Cu 2p <sub>3/2</sub> (shake-up)	943.79	3349.4	2.06
	-N=N-	399.53	6004.31	22.6
	NO <sub>2</sub>	405.58	5009.17	18.92
P3L	Au4d	335.15	23603.36	6.89
	Cu A	571.35	69770.91	-
	Cu 2p <sub>1/2</sub>	952.5	39049.66	-
	Cu 2p <sub>1/2</sub> B	954.67	5484.72	-
	Cu 2p <sub>3/2</sub>	932.7	88335.99	47.35
	Cu 2p <sub>3/2</sub> B	934.51	7292.13	3.92
	Cu 2p <sub>3/2</sub> (shake-up)	943.89	2694.27	1.46
	-N=N-	399.56	7484.83	24.88
	NO <sub>2</sub>	405.67	4644.12	15.49
P4D	Au4d	335.25	27019.18	7.7
	Cu A	570.97	72934.44	-
	Cu 2p <sub>1/2</sub>	952.39	34262.35	-
	Cu 2p <sub>1/2</sub> B	954.44	5914.52	-
	Cu 2p <sub>3/2</sub>	932.62	78825.33	41.25
	Cu 2p <sub>3/2</sub> B	934.59	9968.44	5.23
	Cu 2p <sub>3/2</sub> (shake-up)	943.87	2634.75	1.4
	-N=N-	399.54	8190.68	26.59
	NO <sub>2</sub>	405.62	5476.42	17.84

<b>Material</b>	<b>Cu (0+I)</b>	<b>Cu (II)</b>	<b>Cu (II)/Cu (0+I)</b>
P1L	89.7	10.3	0.11
P2D	88.1	11.9	0.14
P3L	91.5	8.5	0.09
P4D	91.0	9.0	0.10

D and L stand for dark and light lines of the fingerprints.