Supporting Information for

Adhesive tape for spatially resolved and sensitive detection of lead in dust using XRF

Ornella Joseph[1,2], Vikrant Jandev[1], Zhutian Zhang[3], Darbie Kwon[1], Brighten Cho[1], Devena Sammanasu[1], Alyssa Wicks[1], and Marya Lieberman[1]

[1]University of Notre Dame, Notre Dame, IN, USA; [2]Earlham College, Richmond, IN, USA; [3]Holy Cross College, Notre Dame, IN, USA

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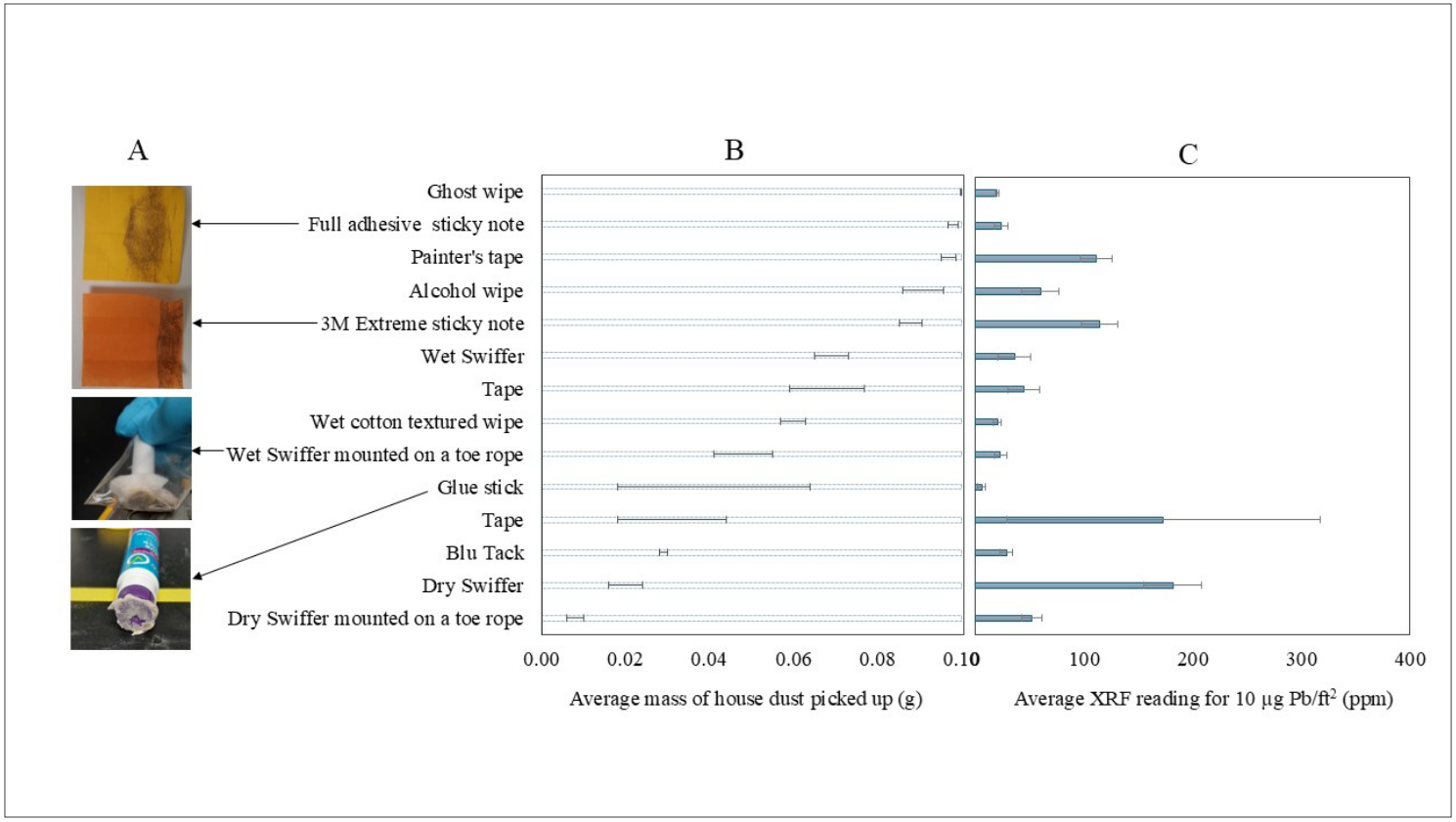

Figure S1 (A). Panel showing images of a subset of the wipes prototyped and tested for dust pick up and XRF response

Figure S1 (B). Average masses of house dust picked up by different wipes when a mass of 0.100 g of house dust was used to dose an area of 1 ft^2. Painter's tape picks up an average mass of 0.095 g of house dust.

Figure S1 (C). Average XRF reading from 3 trials of picking up 0.1 g of 100 ppm Pb paint dust (10 µg of Pb). The error bars represent the standard error of the mean from 3 trials.

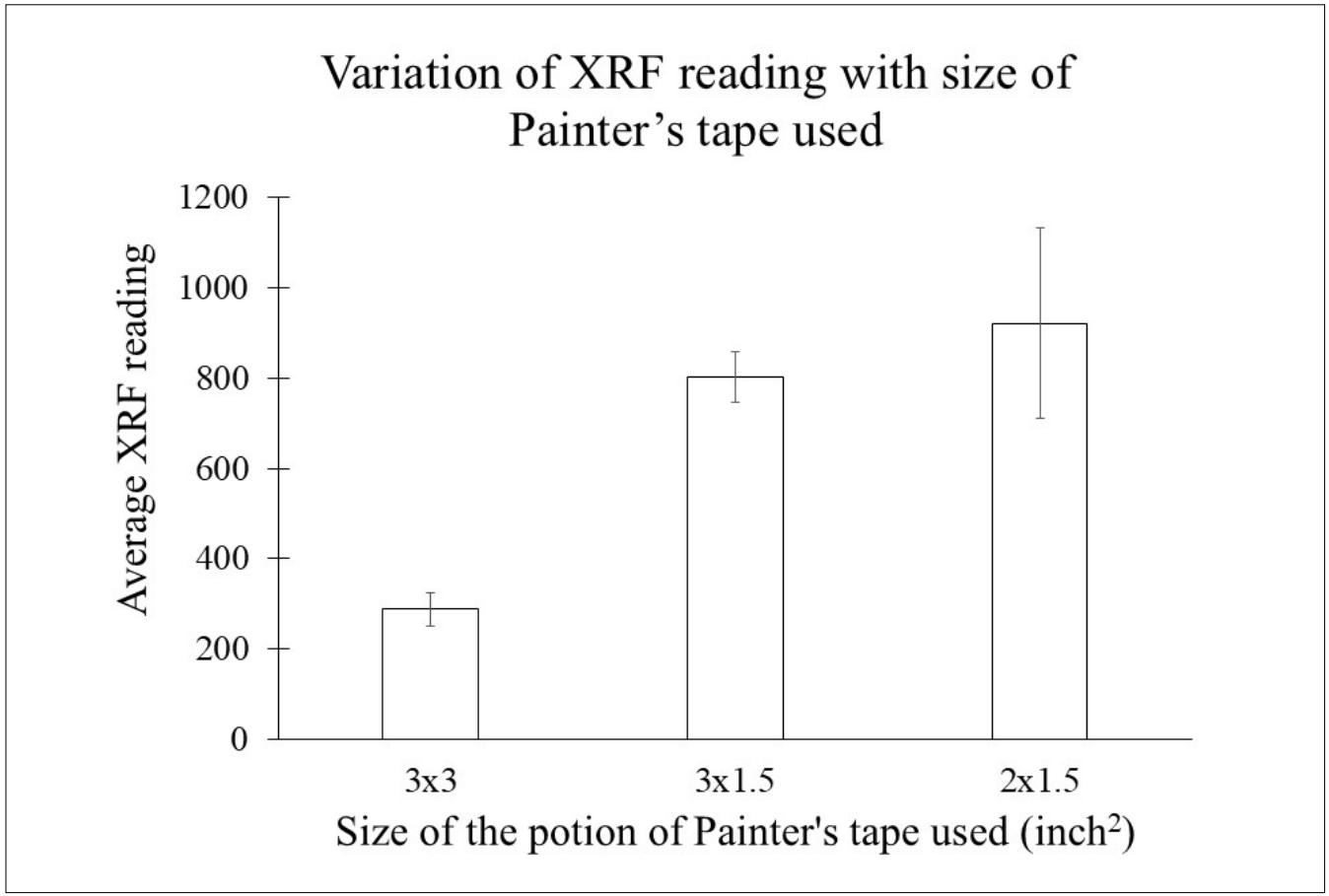

Figure S2. Average XRF reading corresponding to the use of portions of Painter's tape with different sizes to pick up 0.1 g of 100 ppm Pb paint dust (10 μg of Pb). The higher of the two XRF readings obtained from the top side and bottom side of the folded tape was reported in each instance. It must be noted that all the sizes tested here successfully picked up all 0.100 g of the Pb paint dust. The error bars represent the standard error of the mean from 3 trials.

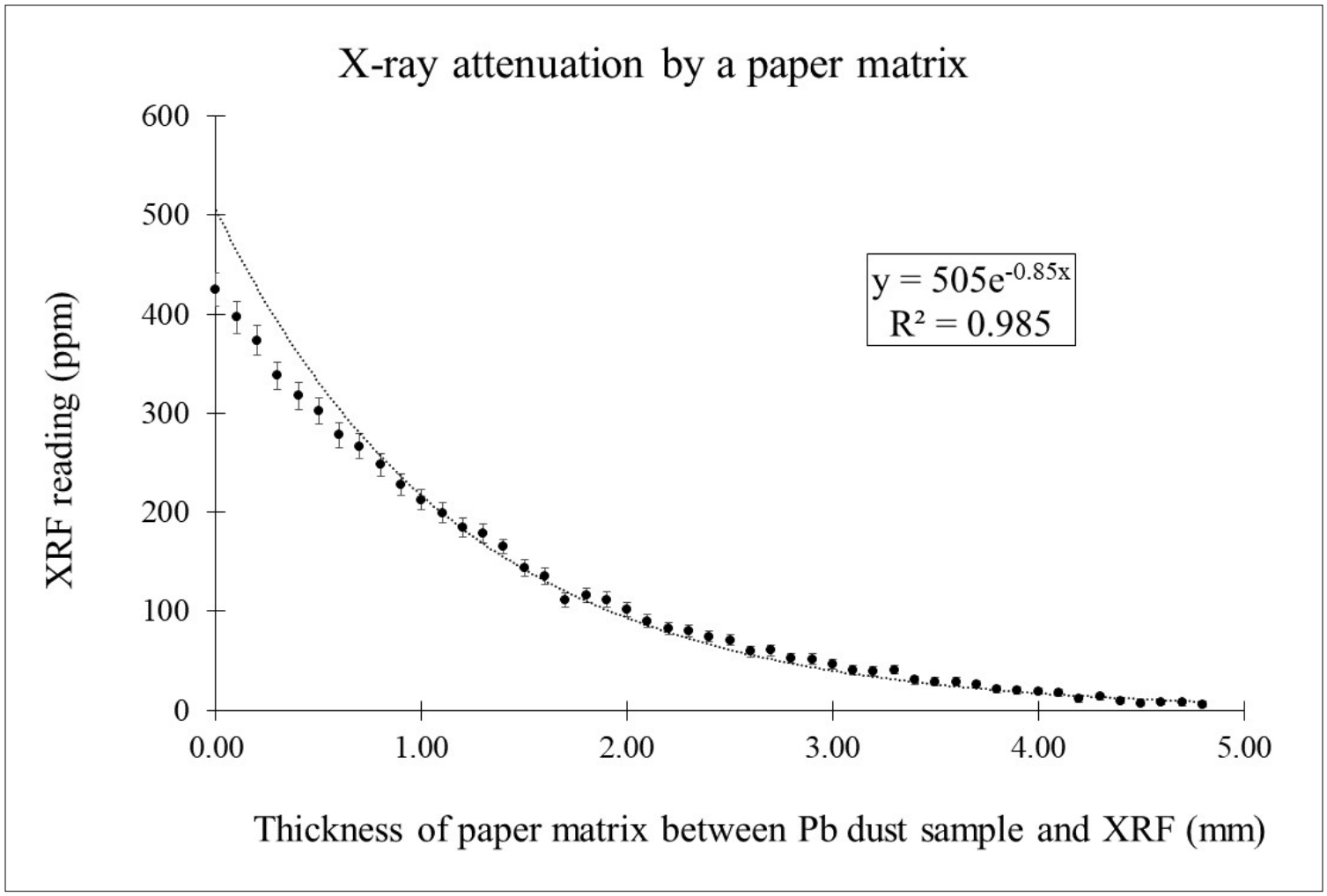

Figure S3. Graph showing the decrease in XRF reading with increasing distance from Pb dust standard sample known to read (500 ± 50) ppm Pb. The distance was introduced by means of stacked sheets of paper between the XRF reading window and the dust sample. Each sheet of paper measured 0.1 mm in thickness.

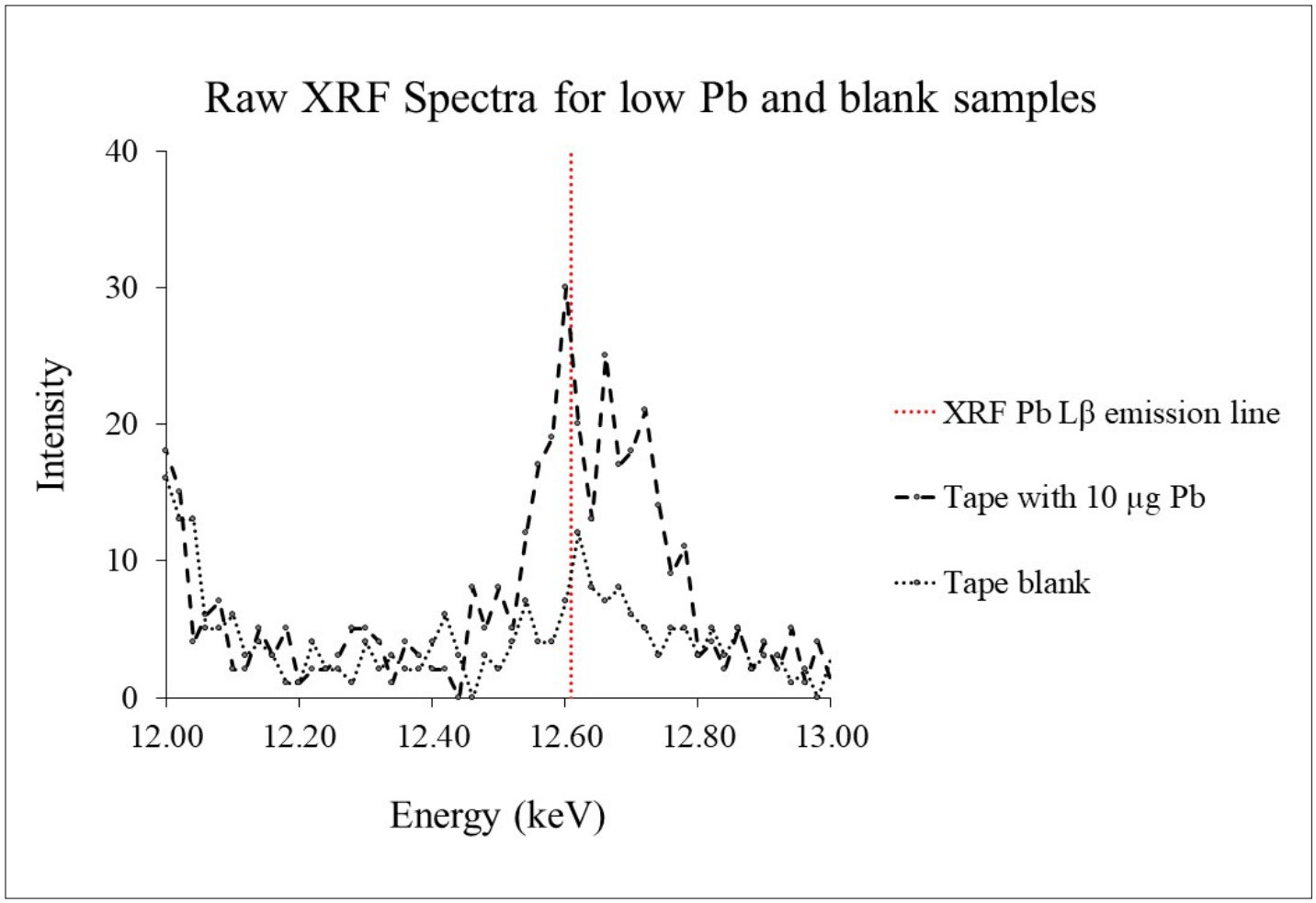

Figure S4. Overlay of a raw XRF spectrum for a tape with 10 µg Pb (dashed line) and a raw XRF spectrum for a blank tape (dotted line). The emission energy range shown on the x-axis has been limited to the region of interest around the characteristic Pb emission energy of 12.61 keV (red dotted line).

Table 1. Comparison of proposed XRF and perovskite methods with other analytical methods currently used or reported for determining Pb in dust.

Test method for lead in dust	**Ghost wipe + ICP-OES**	**Ghost wipe + flame AAS**	**Ghost wipe + graphite furnace AAS**	**Vacuum cleaner dust + XRF**	**Dried wipe + XRF**	**Painter's tape + XRF**	**Rhodizonate color test**	**Painter's tape + Perovskite color test**
References	[1]	[1]	[1]	[2], [3]	[4], [5], [6]	This work	[7]	This work
Time to get test results	days	days	days	hours (requires drying and sieving of dust)	hours (requires drying of wipe)	seconds	seconds	minutes (~15 minutes for solvent to evaporate)
Initial cost	~$80,000+	~$20,000+	~$40,000+	~$20,000+			$39 (for 8 tests)	$75 (for 90 tests)
Training required for a new user	High			Low			None	
Can the test be performed on site?	No	No	No	No	No	Yes	Yes	Yes
Spatially resolved test results	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
LOD (µg/ft²)	2	2	0.1	N/A	10	4.3	1000	100

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