



Investigation of a Manufactured Article Cigarette Lighter

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This is part of a set of resources on the topic.

- Powerpoint summary
- Supervisor Guide
 - For teaching assistants or instructors giving a background and answers to likely student questions.
- For Students
 - MiniProject - Investigation of a manufactured article
 - Explaining the project
 - Instructions for Dismantling
 - How to do this safely
 - Data Booklet
 - With lab test data for reference
 - Materials Selection for a Lighter
 - Instructions on materials selection methodology and how to use CES EduPack.

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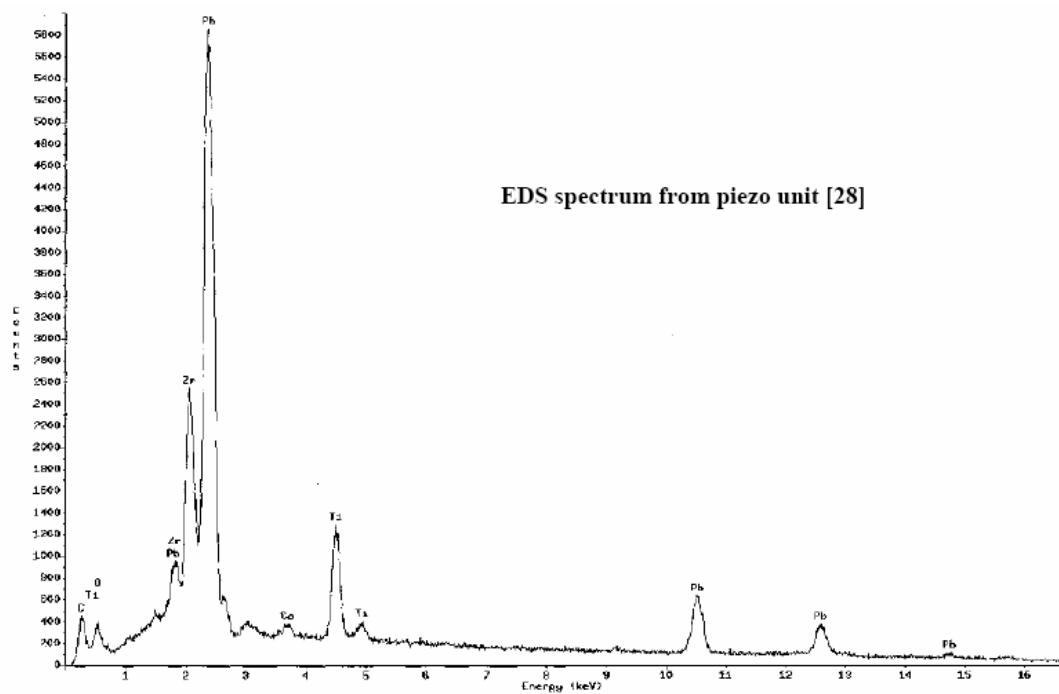
www.grantadesign.com/education/resources

**DO NOT REMOVE
FROM LABORATORY**

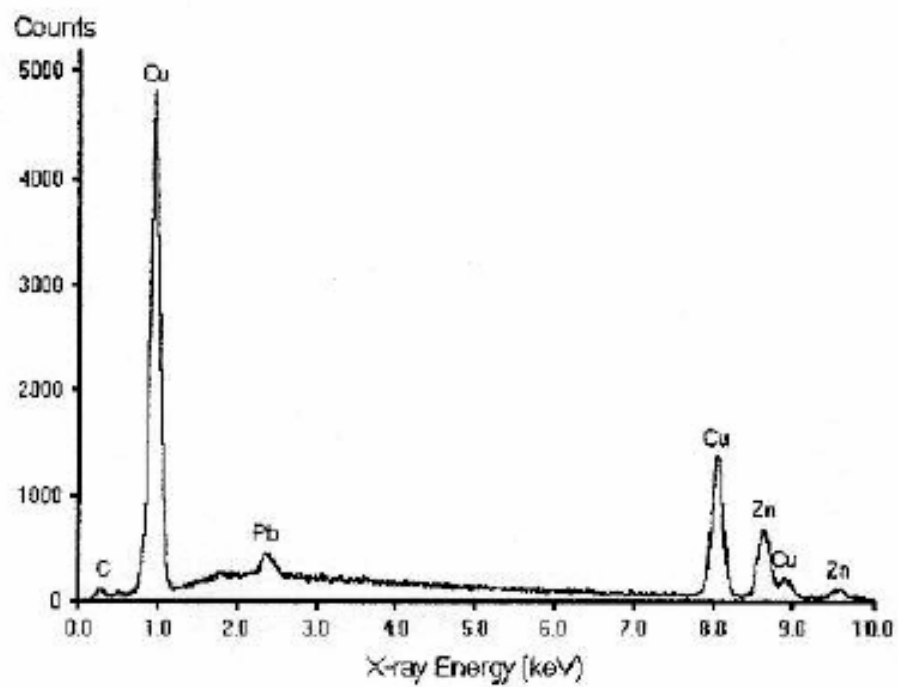
[illegible]

48-0336		Wavelength= 1.54056				
(Pb0.9La0.1)(Zr0.65Ti0.35)O3		2 θ	Int	h	k	l
Lead Lanthanum Titanium Zirconium Oxide		21.770	19	1	0	0
		30.971	100	1	1	0
		38.20	12	1	1	1
		44.392	18	2	0	0
		50.001	4	2	1	0
		55.114	20	2	1	1
		64.591	7	2	2	0
		69.031	1	2	0	1
		73.380	4	3	1	0
		77.615	1	3	1	1
		81.721	2	2	2	2
		89.920	4	3	2	1
		98.146	1	4	0	0
		106.528	1	4	1	1
		115.281	1	4	2	0
Ref. Ibid.						
Sys.: Cubic		S.G.: Pm3m (221)				
a: 4.0780(4)	b:	c:	A:	C:		
a:	β :	γ :	Z: 1	mp:		
Dx: 7.944		Dm: SS/FOM: F15 = 69(.0121 . 18)				

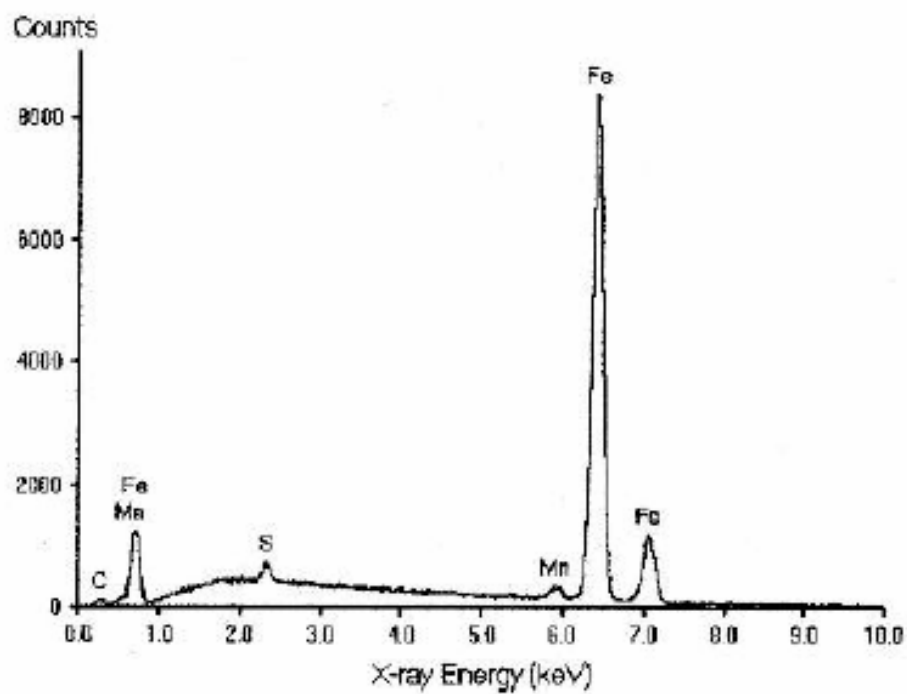
1



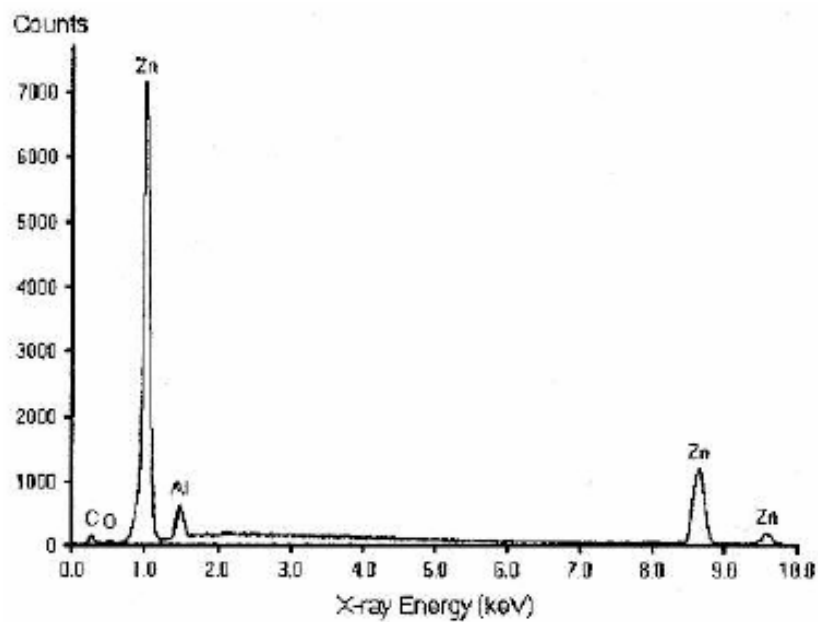
EDS spectrum from nozzle bottom [6]



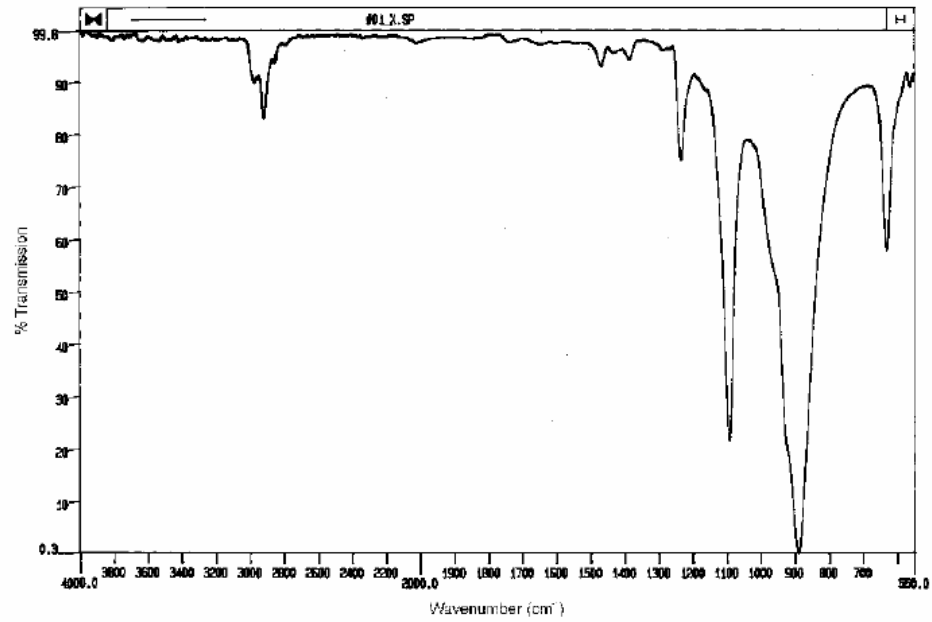
EDS spectrum from hammer [24]



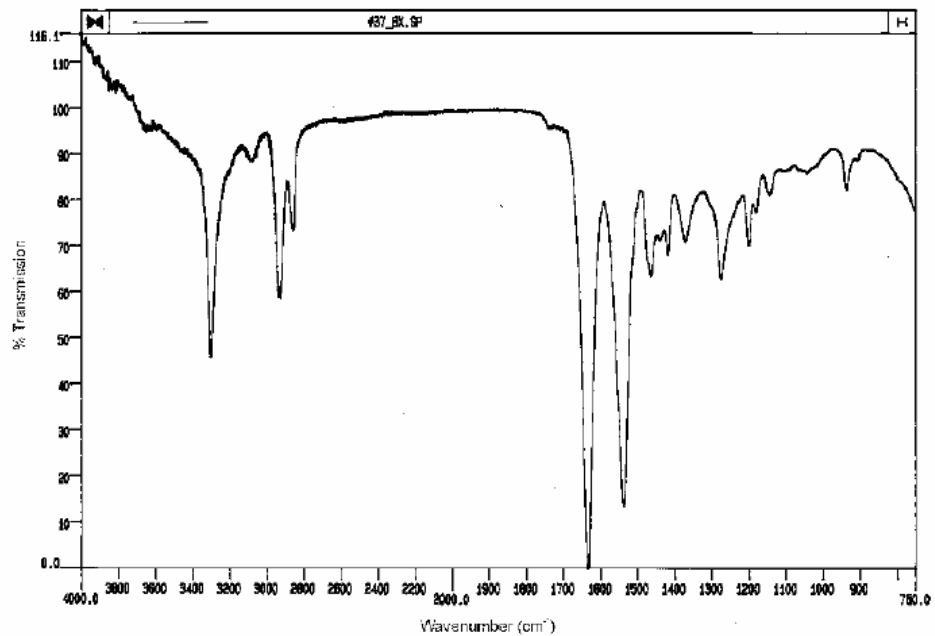
EDS spectrum from backmass [29]



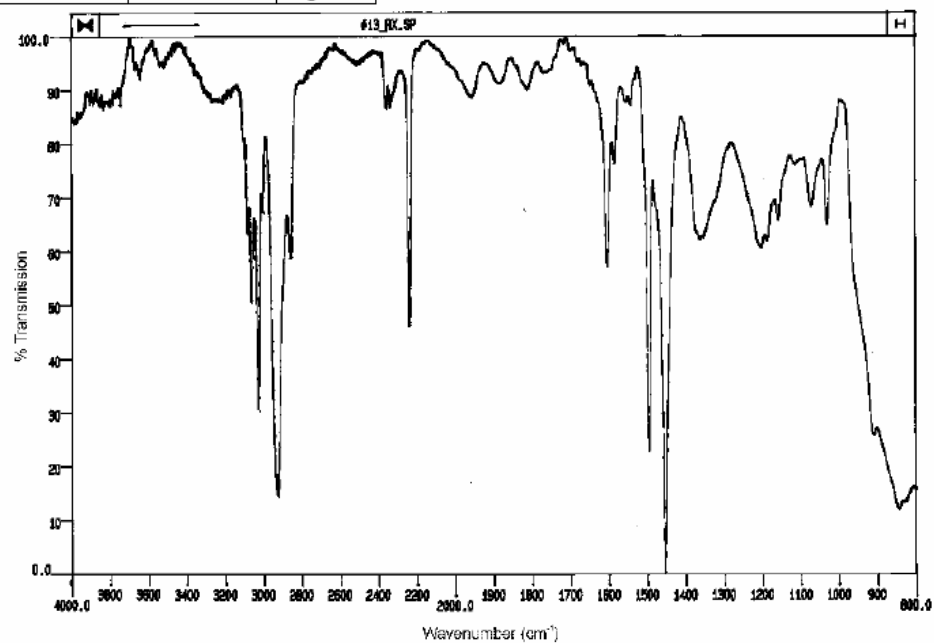
Component	Upper coil [1]	
Glass Transition, T_g	n/a	°C
Melting Point, T_m	160-170	°C
Elastic Modulus, E	2.3-3.1	GPa
Tensile Strength, σ_f	50-70	MPa
Density, ρ	1.41	Mg m ⁻³



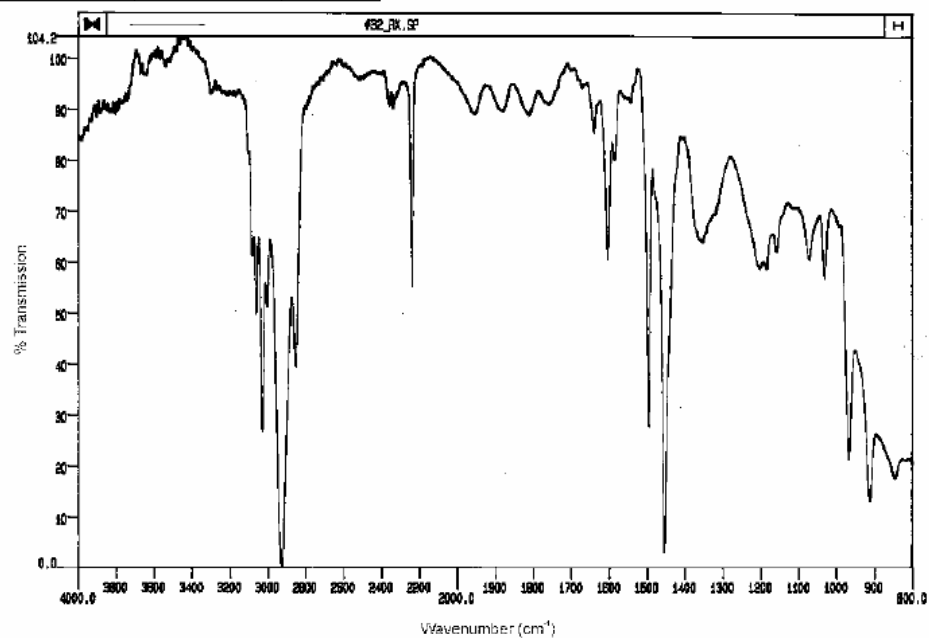
Component	Pole base [37]	
Glass Transition, T_g	n/a	°C
Melting Point, T_m	211-265	°C
Elastic Modulus, E	2-3.3	GPa
Tensile Strength, σ_f	40-85	MPa
Density, ρ	1.14	Mg m ⁻³



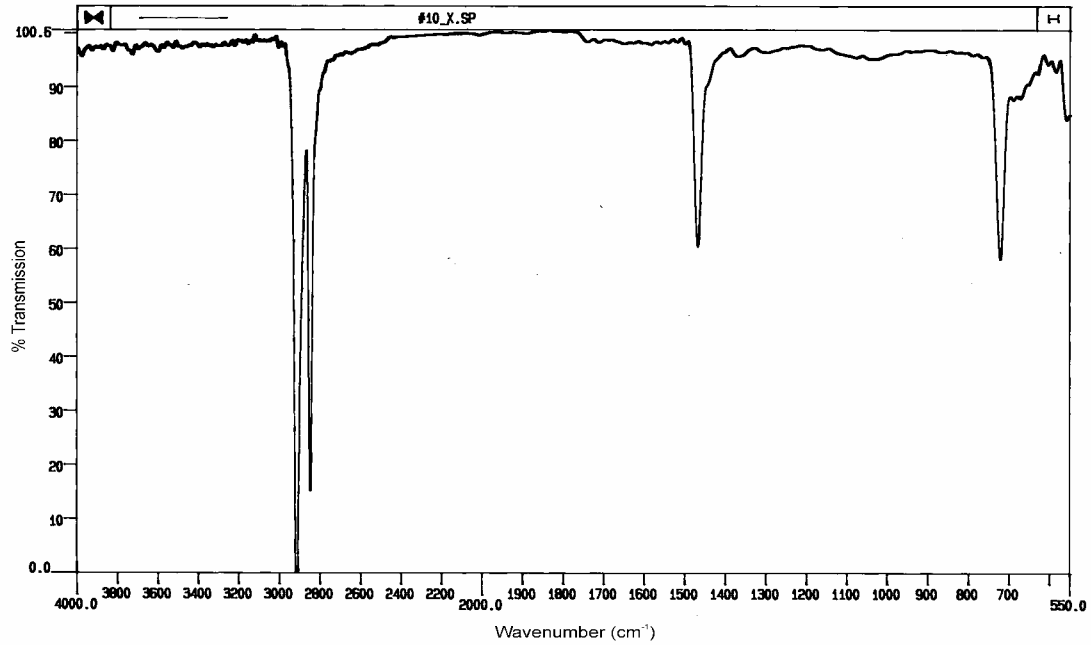
Component	Tank [13]	
Glass Transition, T_g	120	°C
Melting Point, T_m	n/a	°C
Elastic Modulus, E	3.3-4.1	GPa
Tensile Strength, σ_f	45-80	MPa
Density, ρ	1.07-1.25	Mg m ⁻³



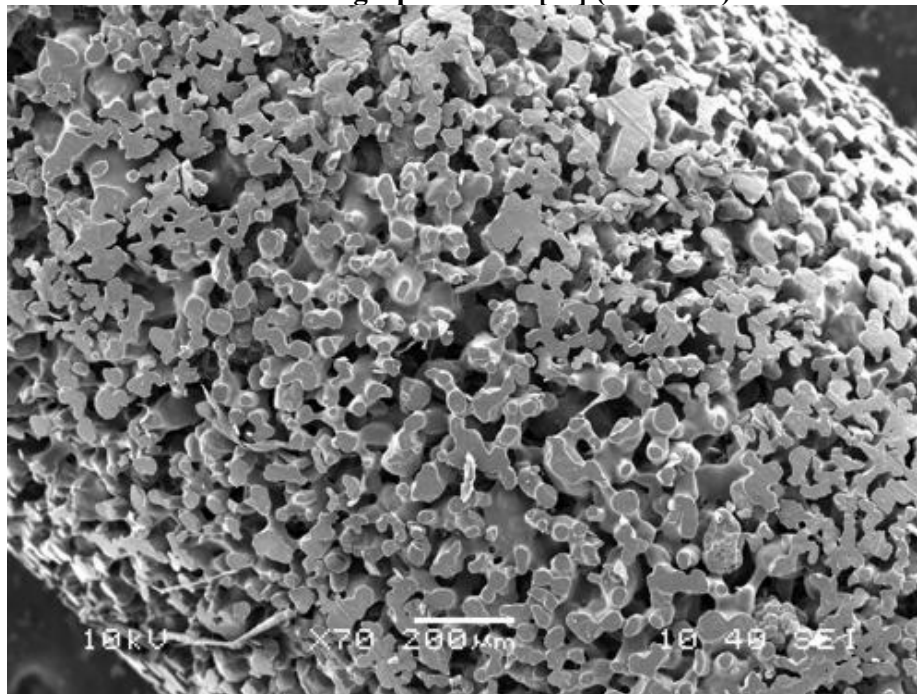
Component	Bracket [32]	
Glass Transition, T_g	110	°C
Melting Point, T_m	n/a	°C
Elastic Modulus, E	1.8-3.2	GPa
Tensile Strength, σ_f	60-90	MPa
Density, ρ	1.02-1.21	Mg m ⁻³



Component	Wick [10]	
Glass Transition, T_g	n/a	°C
Melting Point, T_m	124-131	°C
Elastic Modulus, E	0.5-1.2	GPa
Tensile Strength, σ_f	15-40	MPa
Density, ρ	0.95	Mg m ⁻³



SEM micrograph of wick [10] (side view)



Author

We would like to thank Dr. Rob Wallach of the Materials Science and Metallurgy Department of the University of Cambridge for contributing this resource. You can contact him via the website www.msm.cam.ac.uk.

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