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# Spectroscopic and Calorimetric Evaluation of the Consciousness Energy Healing Treated Lead

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Lead metal is used by humans since form prehistoric period for cosmetics, contraceptive, ornaments, glazes, glasses, enamels, writing material, currency, construction, lead-acid battery, etc. The study objective involves the spectroscopic and calorimetric evaluation of the Trivedi Effect<sup>®</sup>-Consciousness Energy Healing Treated lead powder sample using PXRD, PSA, and DSC analysis. The lead powder sample was divided into control and treated parts. The control sample did not expose to the Biofield Energy Treatment; however, the treated part of the lead sample received the Consciousness Energy Healing Treatment remotely by a renowned Biofield Energy Healer, Dahryn Trivedi. The particle size values of the Dahryn's Biofield Energy Treated lead powder sample were significantly increased by 3.05%(d<sub>10</sub>), 9.5%(d<sub>50</sub>), 13.34%(d<sub>90</sub>), and 11.11%{D(4,3)}; thus, the specific surface area was significantly decreased by 6.25% compared with the control sample. The PXRD peak intensities and crystallite sizes of the treated lead powder sample were significantly altered ranging from -16.09% to 104.65% and -36.56% to 15.79%, respectively; whereas the average crystallite size was increased by 4.62% compared with the control sample. The latent heat of fusion was significantly increased by 6.92% in the treated lead powder sample compared with the control sample. The Trivedi Effect<sup>®</sup>-Consciousness Energy Healing Treatment might be responsible for the generation of a new polymorphic form of lead which may show better powder flowability and thermally more stable compared with the untreated sample. Therefore, the Biofield Energy Treated lead powder would be very helpful to reduce the lead poisoning of the people long-term exposers with the industries manufacturing pipe, paint, food, mining, plastic, glass, chemical, and alloys. Moreover, the improved thermal stability of the treated lead powder would be useful for the metal industry.

**Keywords:** Lead, Consciousness Energy Healing Treatment, The Trivedi Effect<sup>®</sup>, Particle size, Surface area, PXRD, DSC

## 1. INTRODUCTION

Lead (Pb) metal used by humans since form prehistoric period. Naturally, lead found with four stable isotopes together with other five short-lived radioisotopes (IAEA, 2017). For the first time, the ancient Egyptians used lead for cosmetics, glazes, glasses, ornaments, enamels, and sinkers in fishing nets. Many other civilizations in the world also used lead for the writing material, currency, construction, stimulant, contraceptive, making amulets, wire drawing, etc.(Wani *et al.*, 2015). Lead plenty available in Australia, China, Ireland, Russia, Mexico, Portugal, Peru, and the United States (Wani *et al.*, 2015). It has numerous beneficial mechanical properties, including low a melting point, ductility, inertness, and high density. Nowadays it is used in the shotgun pellets, scuba diving weight belts, ballast in sailboat keels, protective sheath for underwater cables, as an architectural metals in roofing material, flashing, cladding, gutters and gutter joints, and on roof parapets; statues and sculptures; used to balance the wheels of cars; lead-acid batteries; solder for electronics (Wani *et al.*, 2015; United, 2017; Parker, 2005; Krestovnikoff *et al.*, 2006;

Jaggard *et al.*, 2018; Putnam, 2003; Gulbinska, 2014). It is also useful for making of the copper alloys such as brass and bronze to increase machinability due to its lubricating qualities. Lead is used in the Oddy test to detect the organic acids, aldehydes, and acidic gases in museum materials (Beiner, 2015). It is used as, or in, colouring agents, oxidants, glass, candles, plastic, semiconductors, polyvinyl chloride coating of electrical cords. Lead-based semiconductors, *i.e.*, lead telluride and lead selenide are also used in photovoltaic cells and infrared detectors (Rogalski, 2010).

The role of lead in the biological system is not clear (Emsley *et al.*, 2015). Lead has the most damaging effects on the human being, which can enter in the body through consumption of food (65%), water (20%) and air (15%), may result in the bioaccumulation of lead (Wani *et al.*, 2015). The main cause of toxicity in the body is its interference with the proper functioning of enzymes, *i.e.*, binding to the sulfhydryl groups found on many enzymes or mimicking and relocating other metals which act as cofactors in many enzymatic reactions (Wani *et al.*, 2015). Lead poisoning leads to nephropathy, degrades the myelin sheaths and numbers, interferes with neurotransmission routes, decreases neuronal growth, colic-like abdominal pains, weakness in the fingers, wrists, and ankles, increases blood pressure, anemia, miscarriage in pregnant women, reduce fertility in males, etc. (Wani *et al.*, 2015; Ana *et al.*, 2007).

Lead poisoning is a life-threatening health hazard and a major concern all over the world. For which, heavy metal content in the food, nutraceuticals, pharmaceuticals, water, air, and soil of the cultivated land needs to reduce. Several attempts are made in order to reduce the lead contamination. In this consequence, the Biofield Energy Healing Treatment (the Trivedi Effect<sup>®</sup>) has the significant impact on the crystallite size, particle size, surface area, chemical, and thermal properties of metals (Trivedi *et al.*, 2013a; b; Trivedi *et al.*, 2015e). The Trivedi Effect<sup>®</sup> (Consciousness Energy Healing Treatment) is a natural and only scientifically proven phenomenon (Trivedi *et al.*, 2016c). Every living organism possesses this kind of unique, para-dimensional electromagnetic field surrounding the body, which originates from the continuous movements of the charged particles, ions, cells, blood/lymph flow, brain functions, and heart function in the body known as Biofield Energy. This Biofield Energy Therapy (energy medicine) have been reported to have substantial outcomes against various disease conditions (Trivedi *et al.*, 2016c; Rubik *et al.*, 2015). A Biofield Energy Healer can harness this inherently intelligent energy from the Universe and transmit it anywhere on the planet through the possible mediation of neutrinos (Trivedi *et al.*, 2016c). National Institute of Health/National Center for Complementary and Alternative Medicine (NIH/NCCAM) recommend and included the Energy therapy under Complementary and Alternative Medicine (CAM) category that has been accepted by the most of the U.S. population (Barnes *et al.*, 2008; Koithan, 2009). The Trivedi Effect<sup>®</sup>-Consciousness Energy Healing Treatment has also been reported with significant results altering the characteristic properties of ceramics [21], organic compounds [22, 23], nutraceutical/pharmaceutical compounds, micro-organism, cancer cells, crops (Trivedi *et al.*, 2015a-d; f; Trivedi *et al.*, 2016a; b; Trivedi *et al.*, 2017), etc. Thus, the current study was designed to determine the impact of the Trivedi Effect<sup>®</sup>-Consciousness Energy Healing Treatment on the physicochemical, and thermal properties of lead metal powder sample using particle size analysis (PSA), powder X-ray diffraction (PXRD), and differential scanning calorimetry (DSC).

## 2. MATERIALS AND METHODS

### 2.1. Chemicals and Reagents

The lead (Pb) powder sample was procured from Alpha Aeser, India All other chemicals required during the experiments were of the analytical standard available in India.

### 2.2. Consciousness Energy Healing Treatment Strategies

The lead powder sample considered for the experiment was divided into two parts. One part of the lead powder sample was treated with the Trivedi Effect<sup>®</sup>-Consciousness Energy Healing Treatment remotely under standard laboratory conditions for 3 minutes and the sample was known as the Biofield Energy Treated sample. This Biofield Energy Treatment was provided through the healer's unique energy transmission process by the renowned Biofield Energy Healer, Dahryn Trivedi, USA, to the test sample. Moreover, the other part of the powder sample did not treat with the Biofield Energy Treatment was considered as a control sample. Further, the control sample was treated by a "sham" healer for comparison purpose. The "sham" healer did not have any knowledge about the Biofield Energy Treatment. After the treatment, the Biofield Energy Treated and untreated lead powder samples were kept in sealed conditions and characterized using modern analytical techniques.

### 2.3. Characterization

#### 2.3.1. Particle Size Analysis(PSA)

The particle size analysis of lead was performed with the help of Malvern Mastersizer 2000, the UK with a detection range between 0.01  $\mu\text{m}$  to 3000  $\mu\text{m}$  using the wet method (Nayak *et al.*, 2011a; b). The sample unit (Hydro MV) was filled with a dispersant medium, i.e., sunflower oil and operated the stirrer at 2500 rpm. The particle size distribution analysis of lead powder was performed to obtain the average particle size. Where,  $d(0.1)$   $\mu\text{m}$ ,  $d(0.5)$   $\mu\text{m}$ ,  $d(0.9)$   $\mu\text{m}$  represent particle diameter corresponding to 10%, 50%, and 90% of the cumulative distribution.  $D(4,3)$  represents the average mass-volume diameter, and SSA is the specific surface area ( $\text{m}^2/\text{g}$ ). The calculations were done by using software Mastersizer Ver. 5.54.

The % change in particle size (d) for lead at below 10% level ( $d_{10}$ ), 50% level ( $d_{50}$ ), 90% level ( $d_{90}$ ), and  $D(4,3)$  was calculated using the following equation 1:

$$\% \text{ change in particle size} = \frac{[d_{\text{Treated}} - d_{\text{Control}}]}{d_{\text{Control}}} \times 100 \dots \dots \dots (1)$$

Where  $d_{\text{Control}}$  and  $d_{\text{Treated}}$  are the particle size ( $\mu\text{m}$ ) for at below 10% level ( $d_{10}$ ), 50% level ( $d_{50}$ ), and 90% level ( $d_{90}$ ) of the control and Biofield Energy Treated samples, respectively.

The % change in surface area (S) was calculated using the following equation 2:

$$\% \text{ change in surface area} = \frac{[S_{\text{Treated}} - S_{\text{Control}}]}{S_{\text{Control}}} \times 100 \dots \dots \dots (2)$$

Where  $S_{\text{Control}}$  and  $S_{\text{Treated}}$  are the surface area of the control and Biofield Energy Treated lead, respectively.

#### 2.3.2. Powder X-ray Diffraction (PXRD) Analysis

The PXRD analysis of lead powder was executed with the help of Rigaku MiniFlex-II Desktop X-ray diffractometer (Japan) (Rigaku, 1997; Zhang *et al.*, 2015). The Cu  $K\alpha$  radiation source tube output voltage and output current was 30 kV and 15 mA, respectively. Scans were performed at room temperature. The size of individual crystallites was calculated from PXRD data using the Scherrer's formula (3):

$$G = k\lambda/\beta\cos\theta \dots \dots \dots (3)$$

Where  $k$  is the equipment constant (0.94),  $G$  is the crystallite size in nm,  $\lambda$  is the radiation wavelength (0.154056 nm for  $K\alpha_1$  emission),  $\beta$  is the full-width at half maximum (FWHM), and  $\theta$  is the Bragg angle (Langford *et al.*, 2017).

The % change in crystallite size (G) of lead was calculated using the following equation 4:

$$\% \text{ change in crystallite size} = \frac{[G_{\text{Treated}} - G_{\text{Control}}]}{G_{\text{Control}}} \times 100 \dots \dots \dots (4)$$

Where  $G_{\text{Control}}$  and  $G_{\text{Treated}}$  are the crystallite size of the control and Biofield Energy Treated samples, respectively.

#### 2.3.3. Differential Scanning Calorimetry (DSC)

The DSC analysis of lead powder was executed with the help of DSC Q200, TA instruments. A sample of ~1-2 mg was loaded to the aluminium sample pan at a heating rate of 10°C/min from 30°C to 350°C (Nayak *et al.*, 2011a; b). The % change in melting point (T) was calculated using the following equation 5:

$$\% \text{ change in melting point} = \frac{[T_{\text{Treated}} - T_{\text{Control}}]}{T_{\text{Control}}} \times 100 \dots \dots \dots (5)$$

Where  $T_{\text{Control}}$  and  $T_{\text{Treated}}$  are the melting point of the control and Biofield Energy Treated samples, respectively.

The % change in the latent heat of fusion ( $\Delta H$ ) was calculated using the following equation 6:

$$\% \text{ change in the latent heat of fusion} = \frac{[\Delta H_{\text{Treated}} - \Delta H_{\text{Control}}]}{\Delta H_{\text{Control}}} \times 100 \dots \dots \dots (6)$$

Where  $\Delta H_{\text{Control}}$  and  $\Delta H_{\text{Treated}}$  are the latent heat of fusion of the control and Biofield Energy Treated lead, respectively.

## 3. RESULTS AND DISCUSSION

### 3.1. Particle Size Analysis (PSA)

The particle size distribution data and surface area of both the control and Biofield Energy Treated lead powder are presented in Table 1. The particle size values of the control lead powder sample at  $d_{10}$ ,  $d_{50}$ ,  $d_{90}$ , and  $D(4,3)$  were 15.91  $\mu\text{m}$ , 36.34  $\mu\text{m}$ , 82.12  $\mu\text{m}$ , and 44.48  $\mu\text{m}$ , respectively. Similarly, the particle sizes of the Biofield Energy Treated lead powder at  $d_{10}$ ,  $d_{50}$ ,  $d_{90}$ , and  $D(4,3)$  were 16.39  $\mu\text{m}$ , 39.79  $\mu\text{m}$ , 93.08  $\mu\text{m}$ , and 49.42  $\mu\text{m}$  respectively.

Therefore, the particle size values in Dahryn's Biofield Energy Treated lead powder were significantly increased at  $d_{10}$ ,  $d_{50}$ ,  $d_{90}$ , and  $D(4,3)$  by 3.05%, 9.5%, 13.34%, and 11.11%, respectively compared to the control sample (Table 1). The specific surface area of the Biofield Energy Treated lead powder ( $0.195 \text{ m}^2/\text{g}$ ) was significantly decreased by 6.25% compared with the control sample ( $0.208 \text{ m}^2/\text{g}$ ). From the results, it can be assumed that the Trivedi Effect<sup>®</sup> - Consciousness Energy Healing Treatment might reduce the intermolecular bond energy of the lead molecules responsible for increasing the particle size of the sample. Moreover, the increased particle size decrease the surface area of the particle may help in enhancing the appearance, shape, and flowability of the compound (Mosharrof *et al.*, 1995; Buckton *et al.*, 1992). Thus, the Dahryn's Biofield Energy Treatment might be helpful to improve the powder flowability and lower the solubility and bioavailability of lead. Low bioavailability of Biofield Energy Treated lead compounds would be helpful to minimise the accident of lead poisoning of the people associated with the manufacturing industry utilizing lead as a raw material or by-product/ industrial waste.

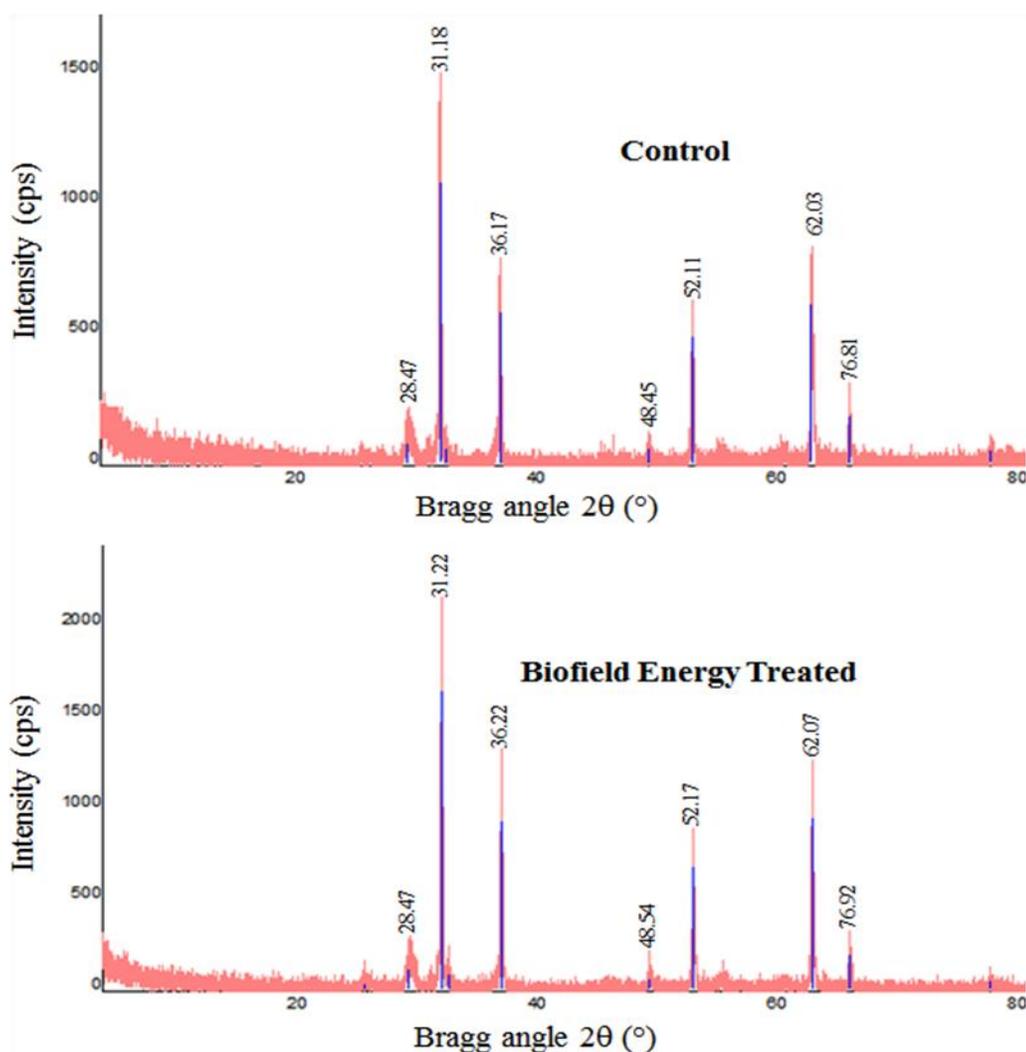
**Table 1:** Particle size distribution of the control and Biofield Energy Treated lead.

Parameter	$d_{10}$ ( $\mu\text{m}$ )	$d_{50}$ ( $\mu\text{m}$ )	$d_{90}$ ( $\mu\text{m}$ )	$D(4,3)$ ( $\mu\text{m}$ )	SSA( $\text{m}^2/\text{g}$ )
Control	15.91	36.34	82.12	44.48	0.208
Biofield Treated	16.39	39.79	93.08	49.42	0.195
Percent change (%)	3.05	9.50	13.34	11.11	-6.25

$d_{10}$ ,  $d_{50}$ , and  $d_{90}$ : particle diameter corresponding to 10%, 50%, and 90% of the cumulative distribution,  $D(4,3)$ : the average mass-volume diameter, and SSA: the specific surface area. denotes the percentage change in the Particle size distribution of the Biofield Energy Treated sample with respect to the control sample.

### 3.2. Powder X-ray Diffraction (PXRD) Analysis

The PXRD diffractograms of the control and Biofield Energy Treated lead powder sample showed sharp and intense peaks (Figure 1 and Table 2), which indicated that both the samples were crystalline. The highest peak intensity of both the samples was observed at  $2\theta$  equal to  $31.2^\circ$  in the diffractograms (Table 2, entry 2). The peak intensities of the Biofield Energy Treated lead sample was altered ranging from -16.09% to 104.65% compared with the control sample. Similarly, the crystallite sizes of the Biofield Energy Treated lead was significantly altered ranging from -36.56% to 15.79% compared to the control sample. Overall, the average crystallite size of the Biofield Energy Treated lead powder sample (570.66 nm) was significantly increased by 4.62% compared with the control sample (598.33 nm).



**Figure 1:** PXR D diffractograms of the control and Biofield Energy Treated lead.

**Table 2:** PXR D data for the control and Biofield Energy Treated lead.

Entry No.	Bragg angle ( $^{\circ}2\theta$ )		Peak Intensity (%)			Crystallite size (G, nm)		
	Control	Treated	Control	Treated	% change <sup>a</sup>	Control	Treated	% change <sup>b</sup>
1	28.47	28.47	50.00	75.00	50.00	134.00	129.00	-3.73
2	31.18	31.22	193.00	263.00	36.27	618.00	689.00	11.49
3	31.72	31.80	8.60	17.60	104.65	688.00	499.00	-27.47
4	36.17	36.22	103.00	171.00	66.02	681.00	624.00	-8.37
5	48.45	48.54	12.00	17.80	48.33	599.00	380.00	-36.56
6	52.11	52.17	80.00	116.00	45.00	684.00	645.00	-5.70
7	62.03	62.07	116.00	160.00	37.93	627.00	726.00	15.79
8	65.16	65.15	27.80	31.40	12.95	707.00	719.00	1.70
9	76.81	76.92	8.70	7.30	-16.09	647.00	725.00	12.06
10	<b>Average crystallite size</b>					598.33	570.66	-4.62

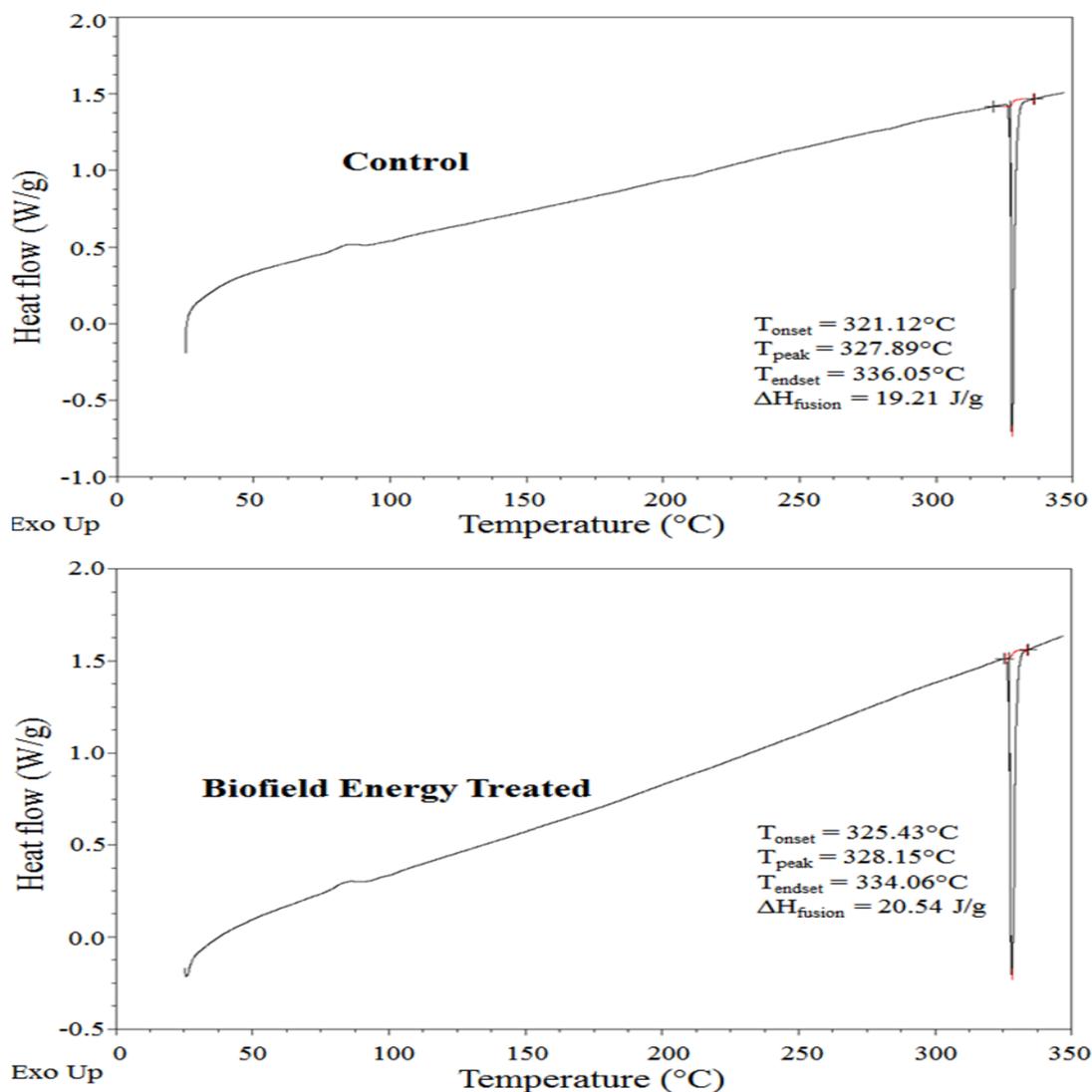
<sup>a</sup>denotes the percentage change in the peak intensity of Biofield Energy Treated sample with respect to the control sample; <sup>b</sup>denotes the percentage change in the crystallite size of Biofield Energy Treated sample with respect to the control sample.

There were the significant variations in the peak intensities and crystallite sizes of the Biofield Energy Treated sample compared to the control sample. The peak intensity of each diffraction face of the crystalline compound changes according to the crystal morphology (Inoue *et al.*, 2013), and alterations in the PXRD pattern provide the proof of polymorphic transitions (Raza *et al.*, 2014; Brittain, 2009). The Dahryn's Biofield Energy Healing Treatment probably produced the new polymorphic form of lead *via* neutrino oscillation (Trivedi *et al.*, 2016). Different polymorphic forms of pharmaceuticals have the significant effects on the drug performance, such as bioavailability, therapeutic efficacy, and toxicity, due to change in their physicochemical properties from the original one (Censi *et al.*, 2015; Blagden *et al.*, 2007). Thus, it can be anticipated that Biofield Energy Treated sample would be better for the industry using lead as a raw material for the manufacturing.

### 3.3. Differential Scanning Calorimetry (DSC) Analysis

The DSC thermograms of the control and Biofield Energy Treated lead samples were shown in Figure 2. The control and Biofield Energy Treated lead samples showed the sharp endothermic peak at 327.89°C and 328.15°C, respectively in the DSC thermogram (Table 3). The melting point of the Biofield Energy Treated sample was very close and slightly increased by 0.08% compared with the control sample (Table 3).

The heat energy required to melt (latent heat of fusion;  $\Delta H_{\text{fusion}}$ ) the Biofield Energy Treated lead (20.54 J/g) was significantly increased by 6.92% compared with the control sample (19.21 J/g) (Table 3). Any alteration in the  $\Delta H_{\text{fusion}}$  can be attributed to the disrupted molecule chains and the crystal structure (Zhao *et al.*, 2015). Thus, it can be anticipated that Dahryn's Biofield Energy Treatment may be responsible for the strong intermolecular force between the molecules of lead metal which improved the thermal properties of the Biofield Energy Treated sample compared with the control sample.



**Figure 2:** DSC thermograms of the control and Biofield Energy Treated lead.

**Table 3:** DSC data for both control and Biofield Energy Treated samples of lead.

Sample	Melting point (°C)	$\Delta H$ (J/g)
Control Sample	327.89	19.21
Biofield Energy Treated	328.15	20.54
% Change*	0.08	6.92

$\Delta H$ : Latent heat of fusion, \*denotes the percentage change of the Biofield Energy Treated lead with respect to the control sample.

#### 4. CONCLUSIONS

The Trivedi Effect<sup>®</sup>-Consciousness Energy Healing Treatment showed a significant impact on the particle size, surface area, peak intensities, crystallite size, and thermal properties of the lead powder sample. The particle size values of the Dahryn's Biofield Energy Treated lead powder sample were significantly increased by 3.05%, 9.5%, 13.34%, and 11.11% at  $d_{10}$ ,  $d_{50}$ ,  $d_{90}$ , and  $D(4,3)$ , respectively compared to the control sample. Therefore, the specific surface area of Biofield Energy Treated lead was significantly decreased by 6.25% compared with the control sample. The PXRD diffractograms of the control and Biofield Energy Treated lead powder sample showed sharp and intense peaks indicated that both the samples were crystalline. The peak intensities of the Biofield Energy Treated lead powder sample was significantly altered ranging from -16.09% to 104.65% compared with the control sample. Similarly, the crystallite sizes of the Biofield Energy Treated lead sample were significantly altered ranging from -36.56% to 15.79% compared to the control sample. Overall, the average crystallite size of the treated lead powder sample was significantly increased by 4.62% compared with the control sample. The  $\Delta H_{\text{fusion}}$  was significantly increased by 6.92% in the treated lead powder sample compared with the control sample. The Trivedi Effect<sup>®</sup>-Consciousness Energy Healing Treatment might be responsible for the generation of a new polymorphic form of lead which may show better powder flowability and thermal stability compared with the untreated sample. Therefore, the Biofield Energy Treated lead powder would be very helpful to reduce the lead poisoning of the people long term associated with the industries manufacturing pipe, paint, food, mining, plastic, glass, chemical, and metal alloys. Moreover, the improved thermal stability of the treated lead powder would be useful for the metal industry.

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#### 456. Glob. J. Environ. Sci. Technol.

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