

**Supplemental Figures for Manuscript:**  
**“Metal-Assisted and Microwave-Accelerated Decrystallization of Pseudo-Tophus  
in Synthetic Human Joint Models**

**Zainab Boone-Kukoyi<sup>1</sup>, Kaliyah Moody<sup>1</sup>, Chinenye Nwawulu<sup>1</sup>, Rukayat Ariori<sup>1</sup>,  
Hillary Ajifa<sup>1</sup>, Janelle A. Guy<sup>1</sup>, Carisse Lansiquot,<sup>1</sup> Birol Ozturk,<sup>2</sup> Gabrielle L.  
McLemore<sup>\*,3</sup> Enock Bonyi<sup>1</sup> and Kadir Aslan<sup>\*,1</sup>**

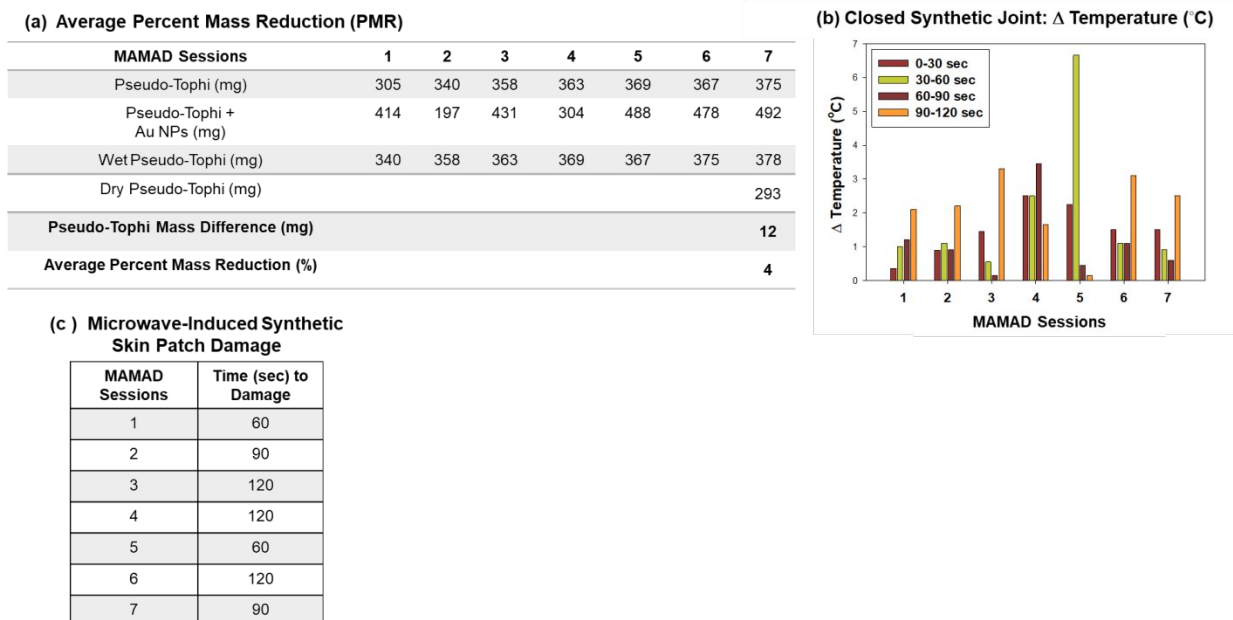
<sup>1</sup>Morgan State University, Department of Civil Engineering, 1700 East Cold Spring  
Lane, Baltimore, MD 21251, USA

<sup>2</sup>Morgan State University, Department of Physics and Engineering Physics, 1700 East  
Cold Spring Lane, Baltimore MD 21251, USA

<sup>3</sup>Morgan State University, Department of Biology, 1700 East Cold Spring Lane,  
Baltimore MD 21251, USA

\*Corresponding Authors: [Kadir.Aslan@morgan.edu](mailto:Kadir.Aslan@morgan.edu) and  
[Gabrielle.McLemore@morgan.edu](mailto:Gabrielle.McLemore@morgan.edu)

**Figure S1. Model 1: Average Percent Mass Reduction (PMR), Time (Seconds) to Microwave-Induced Synthetic Skin Patch Damage, and Change in Temperature (°C) of a Closed Synthetic Joint exposed to 7 MAMAD Sessions (5 W)**



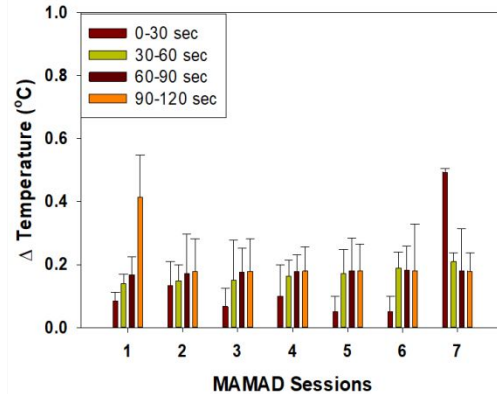
**Figure S1. Model 1: Average Percent Mass Reduction (PMR), Time (Seconds) to Microwave-Induced Synthetic Skin Patch Damage and Change in Temperature (°C) of a Closed Synthetic Joint exposed to 7 MAMAD Sessions (5 W).** (a) Table shows the masses (mg) of pseudo-topphi, pseudo-topphi + Au NPs, wet and dry pseudo-topphi, the pseudo-topphi mass difference, and the average PMR (%). (b) Graph shows microwave-induced temperature changes recorded at 30-second intervals during 7 MAMAD Sessions (5 W). (c) Table shows time to microwave-induced synthetic skin patch damage.

**Figure S2. Model 2: Time to Microwave-Induced Damage to Synthetic Skin Patches from and Change in Temperature (°C) of Three Closed Synthetic Joints during Exposure to the first 7 of 21 MAMAD Sessions (5 W)**

**(a) Microwave-Induced Synthetic Skin Patch Damage**

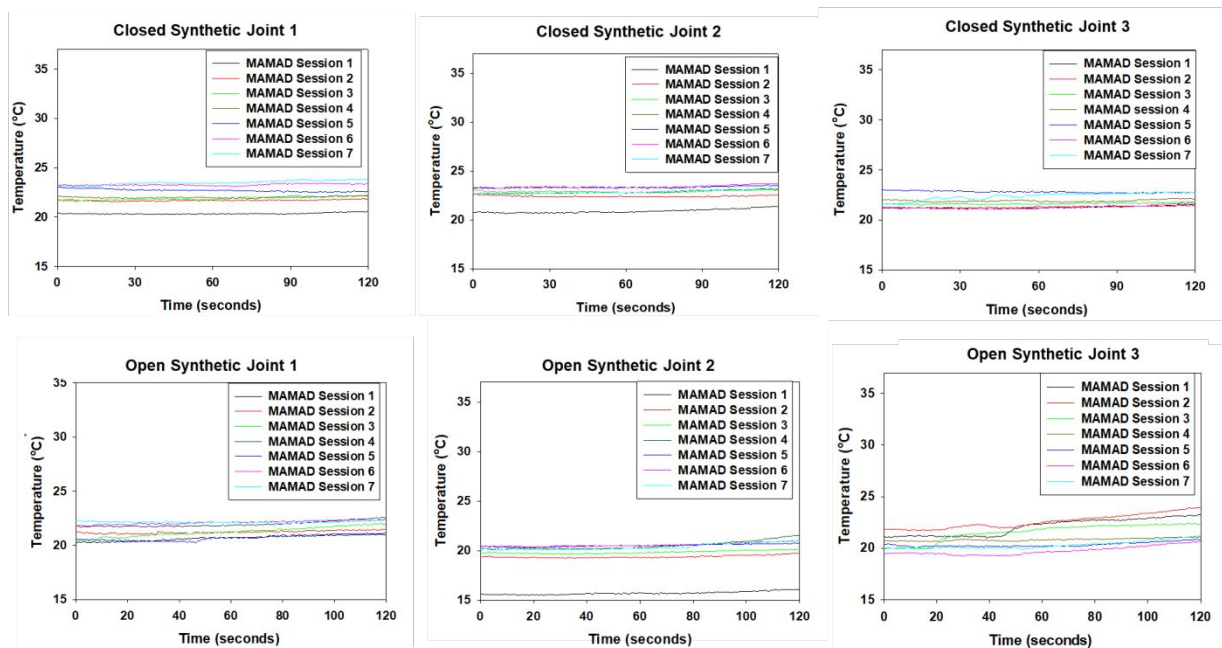
	Skin Patch, Closed Synthetic Joint 1	Skin Patch, Closed Synthetic Joint 2	Skin Patch, Closed Synthetic Joint 3
MAMAD Sessions	Time (sec) to Damage	Time (sec) to Damage	Time (sec) to Damage
1	60	90	120
2	120	120	30
3	90	60	60
4	120	60	60
5	120	60	90
6	120	90	90
7	30	60	60

**(b) Closed Synthetic Joint: Temperature Change**



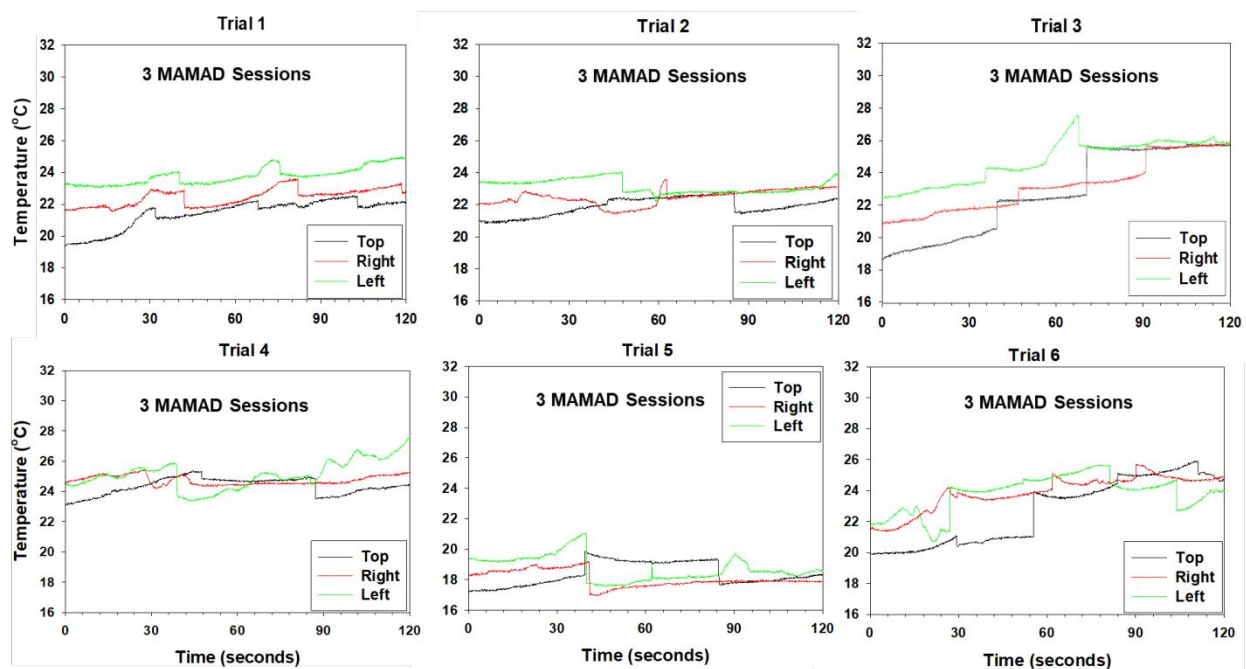
**Figure S2. Model 2: Time to Microwave-Induced Damage to Synthetic Skin Patches from and Change in Temperature (°C) of Three Closed Synthetic Joints during Exposure to the first 7 of 21 MAMAD Sessions (5 W)** (a) Table shows the time (seconds) to microwave-induced damage to synthetic skin patches from three closed synthetic joints during exposure to the first 7 of 21 MAMAD Sessions (5 W). (b) Microwave-induced temperature (°C) changes in a closed synthetic joint during 7 MAMAD Sessions.

**Figure S3. Model 2: Change in Temperature (°C) during Application of the first 7 of 21 MAMAD Sessions in a Closed or Open Synthetic Joint with Embedded Pseudo-Bursas containing Pseudo-Tophi and Au NPs or Deionized Water.**



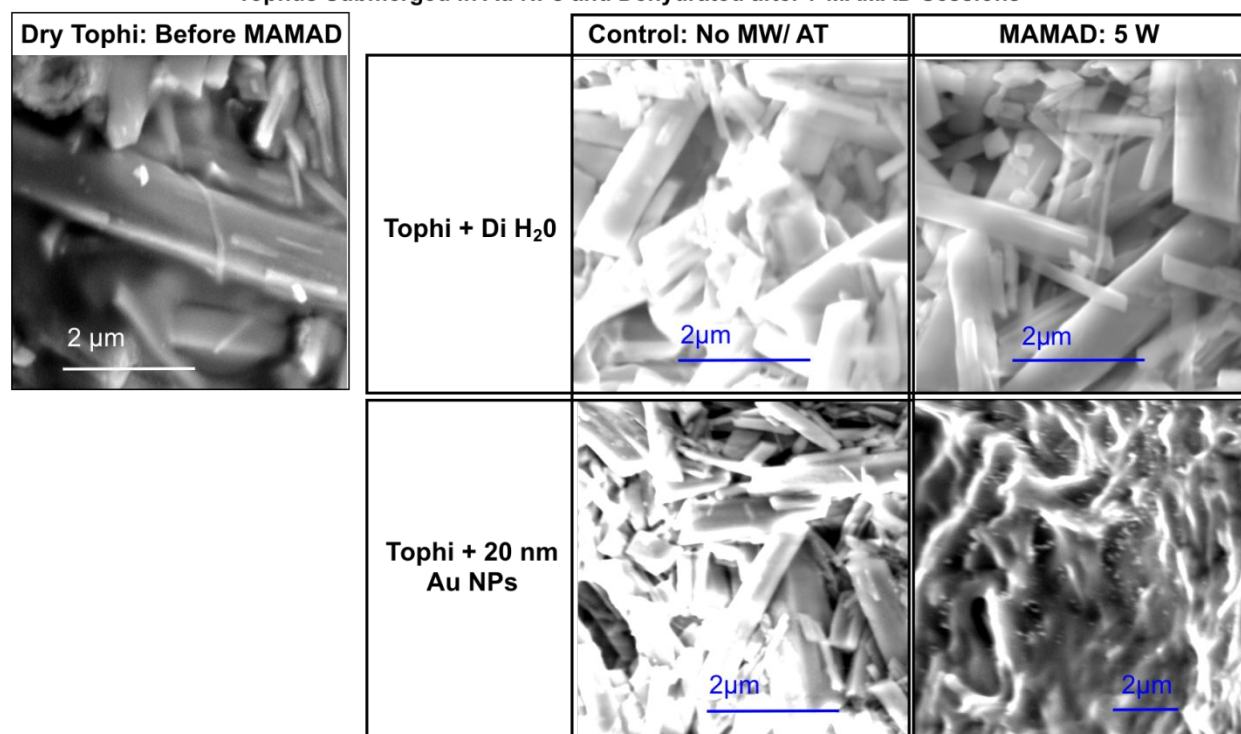
**Figure S3. Model 2: Change in Temperature (°C) during Application of the first 7 of 21 MAMAD Sessions in a Closed or Open Synthetic Joint with Embedded Pseudo-Bursas containing Pseudo-Tophi and Au NPs or Deionized Water.** Graphs show the internal temperature (°C) changes of the closed or open synthetic joint during exposure to the first 7 of 21 MAMAD Sessions for three different closed or open synthetic joints. The final temperatures of both the closed and open synthetic joints remained in the initial temperature ranges.

**Figure S4. Model 3: Change in Temperature (°C) during Application of 18 MAMAD Sessions in a Rotated Open Synthetic Joint (MWH on Right, Top, and Left Sides) with a Pseudo-Bursa containing a Pseudo-Tophus Submerged in Au NPs and Dehydrated after every 3 MAMAD Sessions**



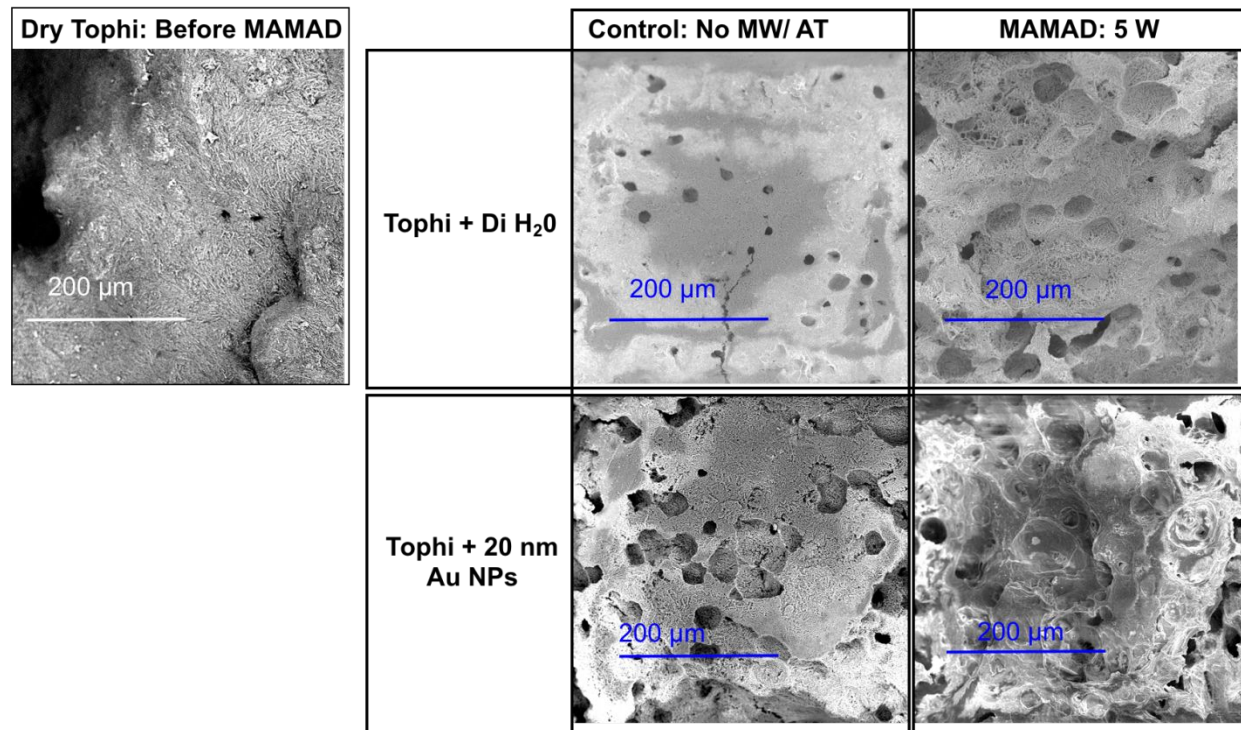
**Figure S4. Model 3: Change in Temperature (°C) during Application of 18 MAMAD Sessions in a Rotated Open Synthetic Joint (MWH on Right, Top, and Left Sides) with a Pseudo-Bursa containing a Pseudo-Tophus Submerged in Au NPs and Dehydrated after every 3 MAMAD Sessions.** Graphs show the internal temperature (°C) changes of the rotated open joint during exposure to 18 MAMAD Sessions at 5 W (18 MAMAD Sessions = 3 x 120-second MWH on the right, top, and left sides of the open synthetic joint = 360 seconds x 6 Trials = 2,160 seconds of MWH) and 1 hour of dehydration after every 3 MAMAD Sessions (after each side). The initial temperature range of the rotated open synthetic joints was 17 - 26 °C and final temperatures remained relatively constant.

**Model 2: Application of 7 MAMAD Sessions in a Closed Joint with a Pseudo-Bursa Containing a Pseudo-Tophus Submerged in Au NPs and Dehydrated after 7 MAMAD Sessions**



**Figure S5 (Replot of Figure 7). Model 2.** SEM images of pseudo-tophi after application of 7 MAMAD sessions in a closed joint with a pseudo-bursa containing a pseudo-tophus submerged in Au NPs and dehydrated after 7 MAMAD sessions. Dry tophi is a control sample and shows the surface properties of the tophi before the application of 7 MAMAD sessions. Scale bar is 2  $\mu\text{m}$ .

**Model 2: Application of 7 MAMAD Sessions in a Closed Joint with a Pseudo-Bursa Containing a Pseudo-Tophus Submerged in Au NPs and Dehydrated after 7 MAMAD Sessions**



**Figure S6 (Replot of Figure 7). Model 2.** SEM images of pseudo-tophi after application of 7 MAMAD sessions in a closed joint with a pseudo-bursa containing a pseudo-tophus submerged in Au NPs and dehydrated after 7 MAMAD sessions. Dry tophi is a control sample and shows the surface properties of the tophi before the application of 7 MAMAD sessions. Scale bar is 200  $\mu\text{m}$ .