

# The 34<sup>th</sup> JUACEP Seminar

第 34 回 名古屋大学日米協働教育プログラムセミナー

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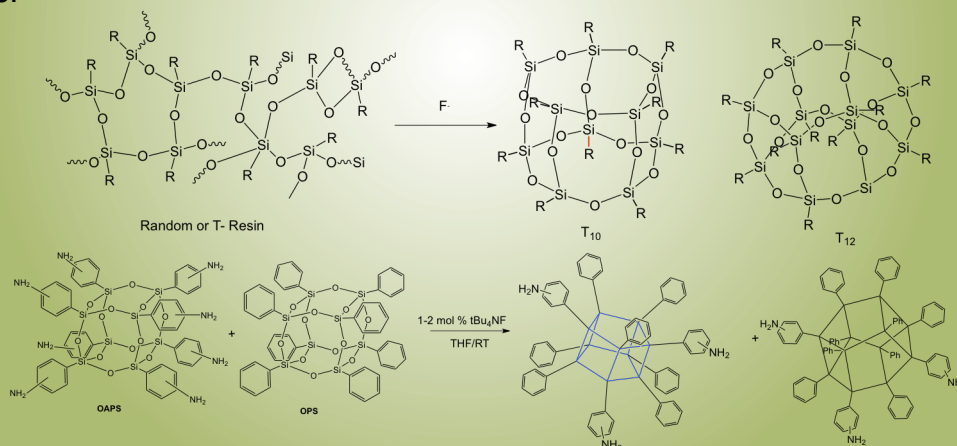
Venue: Lecture Room IB 011

Lecturer: Prof. Richard M. Laine  
Department of Materials Science and  
Engineering, University of Michigan



## F<sup>-</sup> Catalytic Rearrangements of Silsesquioxanes (SQs) and Analogs: New Cage Sizes and Unusual Reactive Properties

We have been exploring the use of tBu<sub>4</sub>NF as a means to transform either polymeric T resins or single functional group T<sub>8</sub> cages into mixed functional T<sub>10</sub> and T<sub>12</sub> SQs as illustrated in the two following reactions.



To this end, we have now developed simple, multigram routes to pure PhT<sub>8</sub>, PhT<sub>10</sub> and PhT<sub>12</sub>. The PhT<sub>8</sub> system offers cubic symmetry whereas the PhT<sub>10</sub> system offers five fold symmetry and is therefore a very unusual molecule. In contrast, the PhT<sub>12</sub> compound has no symmetry. We have also been able to identify and isolate still larger cages as will be discussed. The various cage sizes allow us to explore the effects of symmetry and size on a wide variety of properties. For example, the PhT<sub>8</sub> cage brominates almost exclusively in the *ortho* position. The PhT<sub>10</sub> also brominates preferentially in the same position whereas the PhT<sub>12</sub> is less selective. Modeling studies seem to explain the observed behavior. We have also used Heck catalytic cross coupling to functionalize the *ortho*-bromo derivatives of the cages and explored their photophysical properties.

略歴：1969年カリフォルニア州立大学化学部卒。1973年南カリフォルニア大学博士号(化学)取得。デラウェア大、UC サンタバーバラ、スタンフォード国際研究所研究員を経て1987年ワシントンテクノロジーセンター研究員、1990年からミシガン大学物質化学工学部教員。1999年同大教授、Mayaterials創設者兼CEO、高分子化学工学センター統括者、EXIMOハードコーティング社共同創設者。

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