

Interview

Prof. Dr. Alicia Casitas

Phillipps-Universität Marburg



What got you into studying chemistry in the first place?

My interest in chemistry started in high school because I had a very good teacher and at this point, I had to choose a major. I always liked more scientific disciplines, and since I had this very nice teacher, who was both teaching chemistry and physics, I felt like I really related to the content and could understand the concepts easily. So, I decided to study more of it at the university. This high-school teacher was also a professor at the university, so she used to put a very high level in her classes which may have sparked my curiosity.

I always enjoyed chemistry a lot, and when I was already doing my bachelor's, I decided to do a postgraduation abroad to focus on research. Therefore, I believe a hidden passion has always been there, I followed this pathway, and it worked out well. It could have been that I was not successful in some of the past and then you can think about stopping at some point, but I was lucky enough that I managed to find a way to continue and arrive where I am today.

And why did you choose this interface between organic and inorganic chemistry?

When I was in the last year of my bachelor, I did an internship in physical chemistry, to learn a little bit of theoretical chemistry because I wanted to do a mix between experimental and theoretical. But that made me see that I really liked staying in the lab working with experiments. So I made an agreement to do the bachelor thesis in organic chemistry with a professor, but one day I was walking in the corridors and a professor from Inorganic came and asked me "Why don't you come to my group?". I said to him that I already made an agreement to stay in organic, however, he convinced me by asking to do a short internship: "No but if you have that so clear come do a short stay with me, and then you decide". So, I did this internship with him to keep an open mind. It turns out that I stayed with him to do my bachelor's thesis and later for my Ph.D. in organometallics, always looking at the applications, to see what the complexes can do that are of interest for organic chemistry. Therefore, I always moved between both organic and inorganic, and at one point I think it just became natural. I really like to work with metals and teach this part, always looking for applications in organic synthesis. In the end, you also need to try other areas so you can decide what fits best for you.

Do you have a role model or a chemist who inspired you when considering your career path?

I think there are always some chemists you like to follow, not only as competitors, but also for social inspiration. I remember when I was doing my PhD, since there were not many women in chemistry, I read a lot from Melanie Sanford, who is also doing research in high-valent metal chemistry. But I do have a list of chemists I really enjoy, not only inorganic chemists, but chemists who also dive into organic chemistry.

Why did you move from Spain to Germany, and did you experience any culture shocks?

After my PhD in Spain I did a PostDoc at the Max-Planck Institute für Kohleforschung in Marburg. Then I wanted to go back to Spain for a second PostDoc but after six months I realised, that this is not, what I wanted to do. The terms for independency in Germany are way better, so I came back to Germany to start my professional career. I did not experience a culture shock in Germany, but when I went back to Spain. In Germany people are always punctual and when meeting with my friends in Spain, I also want them to be on time. But at the beginning I had some trouble with the early dinner time in Germany. But for my 1-year old son, we try to eat not at 9 p.m. like we used to.

Has there been a scientific result in your career that you liked the most or that surprised you the most?

You will see in my talk in this afternoon, but the project that I applied to Marburg is to synthesise iron(IV)-compounds, which are very useful and difficult to make and you will see the results that we have achieved. When we got the first crystal structure we were jumping with happiness, because it took us a long time because it was a very difficult project. But you will see some crystal structures of iron(IV)-compounds on a few slides in the talk. That's one thing I am very happy about at the end, that it worked and that doesn't always happen.

Talking a little bit outside of chemistry, what do you like to do in your free time?

Well now I have a 15-month-old baby, so when I come home my free time goes to take care of him; in some way, he has become my hobby. Before I used to like learning languages like German for instance, but I also really enjoy going to the cinema. I'm really a big fan of cinema and TV shows. In my home, we also have a garden where we try to grow up all sorts of things and I'm learning a lot about gardening lately. Also reading books is important for me, I used to read a lot, but my life changed completely in the last year, so I don't have enough time to catch up with everything. I would say I'm a normal person, and now I spend most of the time taking care of my son. I remember I was pregnant and on maternity leave during the tenure track process, which was a big challenge because you cannot enter the lab while doing research. I was out for more than nine months, but fortunately, the students were well-trained and managed to keep things going.

Speaking about research: Where do you get your ideas for upcoming projects?

You need to read a lot of literature and then try to combine some ideas and modify them. I think you always take inspiration from a resource and maybe some older publications. You can try to take inspiration from another field and bring it to your field as well. This is also the case for one of our projects. There are some hypervalent iodine compounds that are broadly used in organic synthesis. So we took them and tried to do reactions with iron compounds, which has not been explored before. It is favorable if you are able to take concepts of another field and bring it to your own. This way you can expand your research into new directions.

Interview



We had some of your papers presented this morning. We asked us how you could ensure the regio- and enantioselectivity for this branched reaction product.

The high regioselectivity could be controlled by the kinetically controlled transition state formed with the Biphosphine ligand, so we proposed it has a lower energy level than for the linear product. The alkyl-substituents need to point towards the ligand (we proposed no covalent interactions) to access the linear product, if they point to the malone, the branched product is formed. The stereoselectivity can be controlled with asymmetric phosphine ligands. So far we have not moved in this direction, but we are looking forward to this investigations in asymmetric catalysis.